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ORIGINAL COMMUNICATIONS.

VACCINATION.

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THE Society having requested that the subject of vaccination be presented for discussion, its Directors have honored me with the invitation to make the introductory remarks. In accepting as I do with pleasure this invitation, it is not my purpose to enter into anything like an elaborate discussion of this comprehensive subject, nor shall I be able within the short space of time at my disposal to even touch upon all the points of interest, but I propose merely to direct attention to and invite discussion on some of the more important and practical points in connection with this vastly important subject. The topics, therefore, which I have selected are as follows:

1. What conditions of the system contra-indicate vaccination? Does pregnancy forbid its use?
2. What is the best method of performing vaccination?
3. The course of true vaccinia.
4. The comparative value of humanized and bovine lymph.
5. The prophylactic power of vaccination.
6. Does vaccination in infancy protect through life?
7. What is the value of revaccination?

When vaccination is to be performed, it is of course desirable that the child should be in a good state of health. Acute diseases and cutaneous eruptions of all kinds are generally regarded as contra-indications, and among the latter affections herpes, eczema, and intertrigo are said to be very liable to interfere with the regular course of the vaccine vesicle. But under exposure to the variola contagion no condition of the system should stand in the way of vaccination. Under such circumstances I have frequently vaccinated persons suffering from measles, scarlet fever, chicken-pox, etc., and with no unpleasant results, but, to the contrary, have prevented variola.

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While it is desirable that an infant should attain the age of at least three months before vaccination is performed, yet when there is immediate risk of infection no age is too early. I have repeatedly vaccinated infants on the day of their birth without any untoward effects.

A question about which there seems to be a good deal of confusion, and one which has been answered both affirmatively and negatively, is, Does pregnancy forbid vaccination? In times of smallpox prevalence I have found no difficulty in answering this question to my own satisfaction and guidance. Though my experience in this direction is not very great, I have seen nothing to lead me to believe that pregnant women incur any special risk under vaccination. Of this, however, I am very certain, viz., that smallpox among pregnant women is very fatal: abortion generally occurs, and death is the usual result. To justify, therefore, excepting pregnant women from vaccination, particularly under circumstances of exposure, it ought to be shown that the risks from vaccination are as great as from smallpox; and this I am sure has never been done.

The late Dr. Charles D. Meigs, regarding cowpox and smallpox as identical in nature and as only differing in intensity, said,* "Do not vaccinate them [pregnant women]. I have been the witness of dreadful distress from the operation. Eschew it, I entreat you."

On the other hand, Dr. Barnes's experience seems to justify the following conclusions:†

1. "Pregnant women living under epidemic or zymotic influences are more prone to take the prevalent morbid poison than others.
2. "Having taken a morbid poison, they are less able to throw it off.
3. "Their system is less able to resist its injurious action. Abortion and a most dangerous form of puerperal fever are very likely to follow."

Dr. Barnes thinks we may conclude, in the absence of decisive evidence of special danger, that "pregnant women are entitled to equal protection against smallpox with the rest of the community, and that vaccination or revaccination should be practised on pregnant women, in their own

* *Females and their Diseases*, p. 575.

† *Half-Yearly Abstract of the Medical Sciences*, July, 1871.

interest, as well as in that of the community of which they form a part."

The next topic to which I shall invite attention is, *What is the best method of performing vaccination?* This question is often asked by younger physicians, and I do not wonder at it, because little or no instruction is given on this point in our medical colleges. The frequent failures that follow the operation, and often spurious results pronounced genuine and protective, fully attest the fact that there is a great deal of carelessness, if not downright ignorance, often displayed in the simple yet important matter of vaccination. During an epidemic prevalence of small-pox nothing is more common than admission to the hospital of unvaccinated patients, stating that they had been vaccinated several times,—perhaps recently,—and that it would not "take;" and their doctor is often quoted as saying that it failed to "take" because their blood was too pure.

Now, if vaccination in an unprotected person is skilfully performed, and with well-selected vaccine virus, failure to "take" should be very uncommon, for I believe there are but very few persons insusceptible to vaccinia. Mr. Marson says that "with good lymph and the observance of all the proper precautions, an experienced vaccinator should not fail of success in his attempts to vaccinate above once in one hundred and fifty times."

The first important step in the operation is to secure a state of perfect solution of the virus to be used. Carelessness in this particular will often result in failure, not only in the use of humanized crust, but also of dried bovine lymph, as usually obtained on ivory points. I apprehend that a common cause of failure in the use of the latter material is that the points are often applied to the abraded surface of the arm, depending upon the exuded blood to dissolve the dried lymph. Instead of this, if a perfect solution of the virus is secured before the application is made, failure should rarely occur, provided the lymph has been properly collected and has not lost its virtue by age.

As regards the best mode of inserting the lymph, I prefer an ordinary thumb-lancet, with its point decidedly dull. Holding the skin at the place of insertion on the arm tense, I carefully make a few longitudinal incisions, drawing but little

blood; then, grasping the arm in its circumference, I stretch apart the small incisions and press the lymph thoroughly into them, either with the lancet or ivory point. By this mode of procedure, and with active virus well dissolved, I very seldom fail to produce in an unprotected person the vaccinal effect. In my judgment, all machines and gimcracks devised especially for performing vaccination are far inferior to the lancet when used with care and skill.

The Course of True Vaccinia.—The regular succession of phenomena that constitute true vaccinia are so familiar to all that I need not stop to describe them minutely, but will be content with directing attention to some of the essential characteristics in its course which I fear are frequently not secured and often undervalued. The careful examination of many thousand vaccine cicatrices on the arms of persons vaccinated in this country and very many European countries fully convinces me that the importance of securing a true Jennerian vesicle is not duly appreciated; and in no country, I am sorry to say, is this want of appreciation more apparent than in the United States. I have been in the habit of carefully examining, for purpose of classification, all vaccine marks of patients admitted into the Municipal Hospital of this city for the past ten years, and the result proves, as my reports from year to year show, that the patients of German birth bear evidence of having had the most thorough, and those of American birth the most careless, vaccination. A perfect vaccine vesicle, pursuing its regular course undisturbed, is sure to leave an indelible scar, presenting certain peculiar characteristics. A cicatrix, therefore, that is far from being typical is evidence that the vesicle has not been of the true Jennerian type, and cannot be so well trusted to afford protection.

In perfectly typical vaccinia, papulation is noticed on the third or fourth day after insertion of the virus, the vesicle begins to form on the fourth or fifth day, the areola should be well marked on the ninth or tenth day, and the crust falls off spontaneously about the twenty-first day. The areola and some slight febrile reaction which accompanies it may, I think, be regarded as essential to true vaccinia. The earlier writers on vaccination, and especially Jenner, went so far as to say that

vaccination unattended by febrile reaction was spurious, and consequently conferred no protection against smallpox, and that in all cases of post-vaccinal variola the alleged vaccination had been of this spurious character. Concerning the correctness of the latter view I think there is much room for doubt, as we shall see farther on.

In order to secure the typical vesicle which has been described, it is necessary that the material used should be of the best quality; and in this connection let us consider *the comparative value of humanized and bovine lymph*.

There is but little difference between the course of vaccinia induced by animal virus and that by virus of recent humanization. Although the former is frequently objected to on the ground that it is dangerously violent in its action on infants, yet I believe the inflammatory action produced by virus of one, two, or three human removes is rather the more intense of the two. But lymph of very long humanization—that which has been transmitted from arm to arm for many years—seems to lose very much of its former vigor. Prior to the introduction of animal lymph into this country by Dr. Henry A. Martin, of Boston, the humanized virus then in general use induced vaccinia of rather shorter duration and of less violence than that which is induced by either the animal or the humanized virus in general use at the present time. It would, I believe, be impossible to find any of the old stock of humanized lymph now in use in this country, it having been entirely supplanted by animal lymph and lymph of recent humanization.

Although the course of vaccinia induced by long-humanized virus is somewhat diminished in its duration and severity, yet I think proof is needed to show that on this account it loses any of its prophylactic power. During the epidemic of smallpox in this city in 1871-72, when vaccination was put to the severest possible test, and when little or no virus was in use but that of long humanization, smallpox did not attack those who had been recently well vaccinated. Furthermore, I have over and over again seen vaccinia induced by this virus, inserted after undoubted infection by the variola contagion, confer complete and absolute protection against the disease, while under the same circumstances I have, I believe, during the present epi-

demic of smallpox, failed in all primary vaccinations to confer immunity when animal lymph has been used. This is not because vaccinia induced by animal lymph is less protective, but because the course of the process is slower, the areola often being two or three days later in appearing; and as we regard the areola and febrile reaction as evidence of systemic impression, and consequently of protection, this difference in time is often of vital importance to a person vaccinated after exposure.

As showing still further that humanized virus of long descent retains the power of inducing vaccinia of the highest degree of excellence, I refer again to the fact that in no country is vaccination carried on more thoroughly and satisfactorily than in Germany, and in that country humanized virus is generally employed. I believe the usual method of performing vaccination in Germany is by the use of eighth-day lymph, commonly practising what is called arm-to-arm vaccination. This method, when practicable, is doubtless the very best; for fresh eighth-day lymph is very certain to succeed, and can only produce true and genuine vaccination, never spurious results.

Until quite recently the vaccine crust has been the form of virus generally used in this country, and with proper care in its selection as good results may be obtained from this form as from any other. It is, however, of prodigious importance that the crusts should be selected only from healthy infants, and from those in whom the vaccination has been characterized by perfect, typical, undisturbed vesicles. The surprisingly large proportion of imperfect and uncharacteristic cicatrices that have resulted from vaccination in this country clearly indicate that vaccine crusts have not been selected with sufficient care and judgment; and to this negligence, I believe, is due the apparent deterioration of humanized lymph of long descent.

After thirty years of experience in the transmission of humanized lymph, Jenner admitted that it may degenerate from want of due care in the selection of subjects, but spoke of its alleged degeneration by mere lapse of time as a "conjecture he could destroy by facts." My arguments thus far are in full accord with this view of Jenner, but I am willing to go further and say that I believe the same want of care in the selection of subjects from whom lymph is taken would also render it liable to serious

contamination. I can, perhaps, very well illustrate my view of humanized virus by comparing it to a stream of water, which may preserve the level of its source, but cannot rise above it; and, as the stream is liable to be contaminated in its course, we are certain of obtaining the purest water from the spring. And so I believe the original source of all vaccine virus—animal lymph—should have our decided preference, if for no other reason, because of its well-known purity.

The communication of any of the ordinary cutaneous diseases, or even scrofula, by vaccination, may be regarded as doubtful. But, certainly, I cannot be considered as an alarmist when I say that there is a possibility—nay, indeed, real danger—of syphilitic infection through the use of humanized virus. That there are well-authenticated cases of vaccinal syphilis on record cannot be denied by any one who has carefully examined the literature on the subject. It is true the danger is not very great, and fortunately can be almost wholly avoided by care, so that after all we are confronted by no valid objection against vaccination, even though there were no other than humanized virus at our command. I quite agree with Dr. Martin, who has so well said,* "If our dilemma was either to abandon vaccination or to practise it notwithstanding a possibility of transmitting syphilis in the operation, I should not hesitate at all: I should continue vaccination, using every possible care to insure the purity of the virus I made use of. But there is no such dilemma. Vaccination can be done in the best possible manner with virus to which no suspicion of syphilitic contamination can attach." Of course, the virus referred to is bovine. I have already alluded to the fact that to Dr. Martin belongs the credit of the introduction of animal lymph into this country. In 1870 he sent his special agent to Europe for the express purpose of procuring some of the original Beaugency "stock." This agent succeeded in his mission, and returned in September of that year, when Dr. Martin at once began the systematic propagation of animal lymph, and, after great labor, large expenditure, and no little anxiety, succeeded in establishing in this country a "service" of animal vaccination, where lymph can be procured in

great abundance, possessing well-tested prophylactic power.

Dr. Martin's success, together with the increasing demand for bovine virus, has induced very many enterprising persons to enter the field as competitors, some of whom doubtless possess the requisite knowledge and ability to carry on the work successfully and to produce virus of undoubted excellence; but there are others, I fear, who, without any fitness for the work, not even realizing its responsible nature, are engaged in propagating and selling so-called "bovine virus," the frequent failures and spurious results from which threaten great injury to the cause of animal vaccination. For some time past I have frequently met with a peculiar form of spurious vaccination, resulting from the use of some of the so-called "reliable bovine virus" now being sold in this city by apothecaries. It consists of a pseudo-vesicle, containing at first a little serum and blood, but soon becoming dense and of a bright-red color, resembling in some respects, when fully formed, a nævus or red raspberry. It is entirely different from any spurious vaccination that I have ever seen from humanized virus, and that it is wholly devoid of prophylactic power I have had abundant opportunity to prove.

For the better protection of citizens against a pestilential disease which is constantly recurring, and which is frequently most destructive to business and commerce, the propagation of animal lymph of perfect quality is of so great importance to the public that it should not be left solely to private enterprise, nor degraded to the level of a commercial trade, but should be under the control of the national or State government, where lymph of undoubtedly good quality could always be obtained free of cost. If this were so, there certainly could be no reasonable objection against the enactment of a law making vaccination compulsory.

The Prophylactic Power of Vaccination.—As regards the protection afforded by vaccination against smallpox, the facts are so numerous that it is difficult to know whence to select examples. Countries in which vaccination is most carefully and systematically performed furnish the strongest proof of its prophylactic power. In Bavaria and Sweden, where the laws regulating vaccination are perhaps the most rigid, variola has ceased to be an infantile

* Transactions of the American Medical Association for 1877.

disease. In Sweden, during the pre-vaccinal period, from 1774 to 1801, the annual average of deaths per million of inhabitants from smallpox was 1973; after vaccination was introduced, but was not obligatory, — 1802 to 1816, — the annual average per million inhabitants was 479; and after vaccination was made compulsory, during the period from 1817 to 1877, the annual average of deaths from smallpox per million of population was only 181. This shows an annual saving of life of 1792 persons out of every million of the population by vaccination, and fully justifies the law making it compulsory.

Mr. Marson's statistics, collected during thirty years of labor at the Smallpox Hospital of London, clearly prove the power of vaccination in modifying smallpox. During this period fifteen thousand cases came under his care, and he found that the unvaccinated died at the rate of thirty-five per cent., while those who had been vaccinated — in infancy, I presume — died at the rate of only six and a half per cent.

Observations made by myself show substantially the same facts. During the last ten years over four thousand cases of smallpox have come under my personal care, and within that period our city has been visited by one of the most malignant and wide-spread epidemics of which we have any record, thus subjecting vaccination to the severest possible test; and the results abundantly sustain its time-honored reputation as a most valuable protective agent. Of the four thousand cases, the unvaccinated have died at the rate of about sixty per cent., while those having been vaccinated in infancy and showing a good cicatrix died at the rate of about ten per cent. Although the death-rates are very large, for reasons which I will not stop to explain, yet the difference in favor of vaccination is certainly very great.

The examples so far given chiefly show the modifying influence of vaccination against smallpox; but vaccination is capable of doing more than that: it will afford perfect protection when recently and thoroughly done. During the past twelve months I have had under my care at the hospital about twelve hundred cases of smallpox, and of this number *only one* had been recently vaccinated. In this case vaccination had been done six months previously, and the cicatrix was of such a character that I was obliged to classify it

as "fair." The disease was but slightly modified, if at all, but terminated by recovery. According to my experience, smallpox under such circumstances is so entirely exceptional that I cannot help questioning the genuineness of the vaccination, though the cicatrix was fair. I have taken the pains to write to the physician (residing in the country) who performed the vaccination, inquiring as to the material used, the course of the vaccinia, etc., but have received no reply. As showing still further the efficacy of recent vaccination, I must add that I have more than once seen a recently-vaccinated infant live in an atmosphere charged with variola contagion, and take its usual supply of nourishment from its mother's breast while the mother was suffering from a tolerably severe attack of smallpox, and the infant remain free from infection. Surely proof stronger than this is not needed to convince any intelligent, thinking person of the prophylactic power of vaccination.

Does Vaccination in Infancy Protect through Life? — It was formerly believed by all physicians, and, I think, is yet by very many, that a genuine vaccination in infancy loses none of its protective power throughout the lifetime of the individual. Now, any one who will take the pains to consult the statistics of a smallpox hospital must come to the conclusion that vaccination at first affords complete protection, or nearly so, and that the susceptibility to smallpox gradually returns and progressively increases throughout childhood and adolescence and up to an undetermined period in adult life.

According to my experience, smallpox after thorough vaccination rarely occurs within the first seven or eight years of life, and I think I may add that up to this age death never results, unless from some complication. But from this age up to the period of puberty the number of cases increase, and death is not infrequent. During the period of youth and adolescence the number of cases very greatly increase, and death becomes quite common. Within the period of life from fifteen to thirty-five years of age post-vaccinal smallpox is of exceedingly frequent occurrence, even when the vaccination of infancy has been most thorough and complete. I have frequently seen smallpox, and often of the worst type, in persons presenting most typical vaccine cicatrices, sometimes to

the extent of six or more on each arm. The sooner the profession recognizes the fact that a vaccine cicatrix, however typical, resulting from vaccination in infancy, is not proof of immunity from smallpox throughout life, the better it will be for the protection of the public against the constantly-recurring epidemics of smallpox, because it would lead to a more general practice of revaccination.

What is the Value of Revaccination?—I am convinced that there is a great deal of confusion in the minds of physicians as to what constitutes a successful revaccination. Many believe that because the vesicle and areola do not observe the typical course of true vaccinia the effect is therefore spurious,—merely the result of local irritation,—and possesses no protective value. But why should we not have modified vaccinia, or vaccinoid, after a primary vaccination, as well as modified smallpox, or varioloid? Certainly there is no reason why we should not. And I believe that as varioloid differs in various degrees of severity from true variola, so likewise does vaccinoid differ from true vaccinia. If this is true, we may then conclude that as varioloid gives protection against a second attack of smallpox, so also does vaccinoid exhaust the return of susceptibility to the disease.

Of persons vaccinated in infancy, the proportion in youth or adult life who are susceptible to revaccination to a greater or less extent may be put down, I think, at about seventy-five per cent. Dr. Martin's statistics show that with animal lymph his success "is very exactly seventy-three per cent. at the first attempt. If those cases which fail to be affected at this first trial are twice more attempted, the result is raised to a fraction over eighty per cent." Dr. Warlomont, of Belgium, who has also had extensive experience in the use of animal virus, gives his success in revaccination as sixty-two per cent., resulting, presumably, from the first attempt. Of course the proportion of successful revaccinations in any community will depend largely upon the character of the primary vaccinations. In this country, where vaccination has been so carelessly and imperfectly performed, we should expect to find revaccination successful in a larger proportion of persons than in some other countries where the operation is conducted with greater care.

Revaccination is thought by many to be necessary only where there has been some defect in the primary vaccination; but as it has already been pointed out that smallpox not unfrequently occurs after the most perfect vaccination, it is therefore evident that revaccination should be generally practised, and without regard to the character of the vaccine cicatrix. The age at which revaccination is called for may be inferred from what has already been said concerning the return of susceptibility to smallpox after vaccination in infancy. When there is danger of infection, I should say that it is wise to revaccinate all persons who have been vaccinated longer than five years, though children under seven or eight years of age will rarely be found susceptible to the vaccinal effect; but subsequent to that age, particularly about and after puberty, it is of extreme importance that revaccination should be performed.

That revaccination destroys again the renewed susceptibility to smallpox cannot be doubted, since there is abundant proof in support of this fact to be found wherever it has been carefully and systematically performed.

It has already been shown that in no country is vaccination carried on with greater care and thoroughness than in Germany. Almost every infant is vaccinated within the first year of life, and revaccination is usually performed about the twelfth year. In addition to this, every person entering the army is again vaccinated, and if this fails it is repeated again and again until the vaccinal effect is produced or the surgeon is satisfied that the person is insusceptible to vaccinia. Consequently the German army is well protected against smallpox, as official statistics prove. During the Franco-Prussian war, smallpox prevailed to an alarming extent, and both armies were freely exposed to the contagion; but the loss by death from that disease in the German army was only two hundred and sixty-three men, against twenty-three thousand four hundred and sixty-eight in the French army; and the latter was never much more than one-half the size of the former. In the French army vaccination and revaccination were in no wise compulsory. Of the large accession of recruits, many had never been vaccinated; and, as there was no rule enforcing revaccination, the army was largely unprotected against smallpox. The great

loss of life which the French army sustained by an eminently preventable disease was doubtless owing to the want of proper appreciation of vaccination on the part of the government, as evinced by the paltry sum of money appropriated for vaccine purposes. The same mistake, I fear, is now being repeated by our City Councils, who, in the face of an epidemic of smallpox of more than ordinary magnitude and virulence, have rejected the request of the Board of Health for an appropriation to carry on gratuitous vaccination.

A very striking example of the value of revaccination is given in a recent number of the *British Medical Journal*. Some eight or nine years ago, when smallpox was very prevalent, the surgeon to a large sailing-vessel discovered, when a few days out at sea, that the captain, in flagrant violation of the rules, had secretly conveyed on board the vessel his son suffering from confluent smallpox. The surgeon at once procured all the vaccine lymph that he could, and revaccinated as many of the crew as it sufficed for. Unfortunately, about one-third or one-fourth of the crew remained unvaccinated. "Of the revaccinated—two-thirds or three-fourths of the whole number—not a single one had caught the disease; but of those who, from no choice of their own, had remained unvaccinated, *all, or all but one or two, caught the disease, and three died.*"

Referring again to Marson's very precise statistics, we find proofs that smallpox is very rare after revaccination. He asserts that but few patients have been admitted into the hospital with smallpox who stated that they had been revaccinated with effect, and that these few had the disease in a very mild form. For over thirty years, during his connection with the hospital, he revaccinated all the nurses and servants, who had not had smallpox, on their coming to live at the hospital, and *not one of them contracted the disease.* At a time, however, when a large number of workmen were employed about the hospital, most of them consented to be revaccinated, but there were a few who declined, and of these two took smallpox, while the former remained perfectly protected.

In the experience of the medical superintendents of the several smallpox hospitals of London, during the period from 1876 to 1879, when 11,412 cases of smallpox occurred among vaccinated persons,

not one case occurred, within the cognizance of either of the medical superintendents, of any person who had been efficiently vaccinated and successfully revaccinated. Of the nurses and servants employed at the various hospitals, numbering about one thousand, some half-dozen only contracted the disease, and these for some cause or other escaped revaccination before entering the wards.

My own experience entirely agrees with that of the observers just quoted. Only very few persons have been admitted into the hospital under my charge with smallpox who presented evidence of having been successfully revaccinated, and these few have had the disease in so mild a form that death has never occurred among them. During the last ten years, no person entering the hospital in any official capacity, whether as assistant-physician, steward, matron, nurse, or other employé, who had taken the precaution to be revaccinated before entering upon duty, has taken smallpox; but, on the other hand, I have seen a few employés, in whom revaccination was omitted, infected by the disease. With such facts as these before me, I feel warranted in concluding that if vaccination were efficiently performed in infancy, and revaccination successfully accomplished at puberty, we might then be able to realize the fact that Jenner was no mere dreamer when he said that vaccination is *capable* of extirpating smallpox from the earth.

CONVULSIONS DUE TO DEPRESSION OF SPINAL REFLEX-INHIBITORY CENTRES;

WITH SPECIAL REFERENCE TO THE CONVULSIONS OF APOMORPHINE, ATROPINE, STRYCHNINE, AND OTHER POISONS.

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IT seems to be a prevalent, if not, indeed, an almost universal, belief that convulsions are invariably the result of a direct or indirect stimulation of the cerebral or spinal centres, or of the nerve-peripheries or muscles; and even in the case of certain drugs that in every other respect are either depressant of nervous structures or do not appreciably affect them, nothing is more common when they cause convulsions than to find it stated that the phenomena were due to a stimulation of certain

portions of the nervous system, but of the cord more especially. My attention was first attracted to the erroneousness of this belief a couple of years ago, while experimenting with apomorphine, when I found a coexistent condition of paralysis and convulsions in animals poisoned with it. These animals, it was observed, would lie as if lifeless, and no reflex action could be elicited by any sort of stimuli; yet suddenly a hyperæsthetic condition would appear, and the slightest touch, or sometimes even a breath of air, would induce most violent tetanic convulsions, which were sometimes so very decided and persistent that the animal would die in a rigid condition and be found in the course of several days dried in an opisthotonus state. Upon testing the action of apomorphine on the motor and sensory nerves, it was found to depress both decidedly, and no evidences of a stimulation of these structures could be discovered; and in a very careful series of experiments on its action on the spinal cord not the least signs of stimulation could be observed, except during this hyperæsthetic condition, and, furthermore, the convulsions occurred in the posterior portion of the body after section of the cord in the upper dorsal region, showing that they were spinal.

These phenomena, in the light of our physiological knowledge, were then inexplicable; for it was seemingly impossible that a drug could act at the same time as a powerful depressor and stimulator of contiguous portions of a structure which is so intimately associated as the motor and sensory portions of the spinal cord; and it was similarly perplexing to understand how it was possible for a drug to cause a state of such profound paralysis, and yet in a little while, and in the midst of it and during a continued absorption of the poison, for a condition of decided stimulation to appear. Hence the utter inability to consistently believe that the paralyzed structures could be so rapidly restored, and a condition of hyperæsthesia exist, or that such a decided nervous depressant of the cord could at the same time possess the power of a stimulant so potent as to cause a hyperæsthetic condition in the midst of profound paralysis, led to the belief that the drug acted on certain hypothetical *spinal reflex-inhibitory centres*, which presumably were similar in their functions to those discovered by Setschenow in the

base of the brain, and which had been inferred as existing by recent physiologists, such as Ferrier, Hermann, Bernstein, and especially Foster, who speaks of this function as a resistive power.

Atropine has been found to give rise to similar phenomena, and the action of this drug in the production of the tetanoid symptoms has been carefully studied by Frazer.* This observer found that after the exhibition of a small or rather less than a fatal dose to frogs a slight degree of weakness occurs in the posterior extremities, and motricity becomes gradually more and more impaired, until finally neither respiratory nor voluntary movements occur. Application of various stimuli to the motor and sensory nerves shows that their functions are retained, although in an impaired degree. Some hours afterwards both the afferent and efferent nerves are found to be functionally incapable, although the muscles still retain their irritability. This condition may last for many hours or several days, and the first symptom of a change in animals is noticed in regard to their flaccidity,—the anterior extremities becoming flexed, and their muscles, as well as those of the chest, becoming rigid and decidedly tetanoid. An exalted reflex excitability is now developed, so that a touch of any portion of the skin will increase the spasm in the anterior extremities and chest-muscles, and produce spasmodic movements in the posterior extremities. After a while the same stimulus will induce violent attacks of tetanus, and at a later period the tetanus becomes still more violent, and the duration of the paroxysms is decidedly more prolonged, so that when this convulsive stage is fully developed the animal is in a condition of almost constant spasm. These paroxysms may be elicited at will by simply slightly irritating the skin; but, if frequently repeated, they become shorter in duration and less violent, but reacquire their activity after a proper period of rest.

In this present condition voluntary motion is impaired, although not entirely lost, as the animals are capable of executing some movements.

Frazer now sought to determine the causation of the paralytic-convulsive phenomena, and he therefore first performed a series of experiments in which were

* Transactions of the Royal Society of Edinburgh, 1869, vol. iii. p. 357.

ligated all the blood-vessels going to a single extremity or to the two posterior extremities, when he found that the convulsions occurred in the unpoisoned limbs the same as in the others, and these results he afterwards corroborated by subsequent experiments of the same kind. This, as he points out, clearly indicates that the convulsions cannot be of peripheral origin. Experiments were then performed to show whether they were cerebral or spinal, and, consequently, section of the cord, in a number of animals, was made immediately below the brachial enlargement, with the result of finding that the convulsions occurred in both the anterior and posterior extremities,—thus satisfactorily determining that they were of spinal origin.

Finding, as he believed, that a paralyzant condition coexisted with one of spinal stimulation, he endeavored, by a very novel and ingenious method, to obtain confirmatory evidence by a means which he terms very aptly one of "physiological synthesis." With this process he endeavored to imitate the effects of atropine by giving in conjunction a substance that causes paralysis with one that produces spinal stimulation,—the one being methylstrychnium, which is a paralyzant of the peripheries of the motor nerves,* the other strychnine, which, as is generally supposed, stimulates the motor portions of the spinal cord. The results of these experiments were that he observed phenomena strikingly similar to those in atropine-poisoning, and he therefore believes, after summing up all the evidence deduced from his carefully-conducted researches, that the convulsions are dependent upon a stimulation of the medullæ oblongata and spinalis, and the paralysis, as he previously intimated, to a depression, at least in part, of the efferent nerves; for it is stated that the drug paralyzed the motor nerves, and that the convulsive stage was most marked after the recovery of this paralysis.

If there is a coexistent condition of spinal stimulation and depression of the motor nerves, as above certified, it would be readily explainable how it is that the convulsive stage is put off for such a prolonged period, for it would seem apparent that the reason why impulses reaching a hyperaesthetic cord were not manifest in

convulsive moments was simply because the efferent nerves were incapable of performing their function. But a conclusion like this is untenable, since it is invalidated by the results of certain of the above experiments, in which the poison was prevented from going to certain of the extremities; for it is obvious that if the tetanoid stage were postponed because of a paralysis of the motor nerves, the convulsions would occur in these unpoisoned members at once, or at least before they would in other parts of the body: but this is not the case, as has been shown by the more recent researches of Ringer and Murrell,† in which it was found that the convulsions came on in the poisoned legs as soon as in the others. And for a like reason it cannot be due to a depression of the sensory nerves, because irritation of one of these nerves, to which the access of the poison has been prevented, will not give rise to convulsions any earlier in the poisoning than irritation of other portions of the body. It seems, therefore, very clear that both the convulsant and the paralytic phenomena must be of spinal origin, although the depressed condition of both the afferent and efferent nerves would contribute to the latter result; and Ringer and Murrell's experiments fully corroborate the assumption that not only are the convulsions and paralysis due to a spinal action, but that they are both due to depression.

In their researches with this drug, and also with the box (*Buxus sempervirens*) and gelsemium, they have fairly demonstrated that the diminution or even destruction of the "resistive" power of the cord is the sole cause of the tetanus, and that all these poisons are powerful depressors of the reflex function of the spinal cord; and, furthermore, if full doses are given, complete spinal paralysis will follow. Frogs thus poisoned first exhibit great weakness, which gradually deepens, and finally tetanus supervenes. At one period of the poisoning a co-ordinate reflex act or a tetanus can be induced, according to the strength of stimulus,—the weaker stimuli eliciting the former, and the stronger the latter. As the poisoning progresses, the tetanus grows stronger and the normal co-ordinate reflex action weaker, until the animal reaches a condition of almost constant spasm, and finally the tet-

* Journal of Anatomy and Physiology, 1868, vol. ii. p. 224.

† Medico-Chirurgical Transactions, vol. lix., 1876, p. 389; and Journal of Anatomy and Physiology, 1877, p. 527.

anus itself slowly declines, until nothing but a mere quivering can be induced.

In interpreting the meaning of these phenomena they maintain that at the onset of the tetanus no increased excitability of the cord is present, but that there is one of paralysis, because the tetanus is preceded by the paralysis, and as the tetanus grows stronger co-ordinated reflex action grows correspondingly weaker, indicating that the paralysis of the cord is growing greater, because of the inability of the spinal centres longer normally to co-ordinate reflex movements; and as a consequence of this paralysis the impulses received from the peripheries are no longer confined to certain segments of the cord and reflected or transmuted so as to give rise to a normal reflex movement, but can diffuse themselves along the cord, and by thus affecting a multiplicity of motor cells give rise to a series of movements which we understand as a convulsion; and, moreover, that when the convulsions subside the cord is in a paralyzed condition, instead of possessing at least an approach to the normal irritability, as would seem to be the case if the tetanus were due to a temporary stimulation.

Of all established beliefs there appears to be none which is more universal and more firmly rooted than that strychnine is a powerful stimulant of the spinal cord, and that the convulsions it induces are due to this action; yet recent research has given us some good reasons to change our opinion entirely regarding this action, and to assume, as in the case of the drugs previously mentioned, that the tetanus is also one due to depression. 1st. This drug, as has been conclusively determined, exerts a well-marked influence on the vaso-motor centres,* which it so affects as to cause a decided rise in the blood-pressure; and it was further found by Schlesinger that after section of the cord the rise of arterial tension still occurs, and, moreover, that if a sensory nerve was stimulated in animals thus operated upon, a rise of blood-pressure would be produced; and certain of the experiments of Klapp add confirmatory proof to this. It must therefore be obvious that strychnine, unlike any other drug, affects certain spinal vaso-motor centres; and

Schlesinger endeavors to explain this eccentric action by assuming that normally a peripheral vaso-motor impulse can only be reflected or transmuted from the central nervous system after it has reached the principal or presiding centres in the medulla oblongata, but that in strychnine-poisoning the medulla spinalis is so affected that these impulses are no longer conveyed to these dominant centres, but diffuse themselves along the cord, as we have seen in the case of afferent impulses in other forms of poisoning, and by affecting a multiplicity of spinal vaso-motor centres give rise to a general vaso-motor constriction. This theory of Schlesinger's very clearly coincides with the one already advanced by Ringer and Murrell and myself, and, like it, presupposes the existence of a normal "resistive" power in the cord, which is either paralyzed or, at least, held in abeyance by the poison. But in this case the resistive power would seem to be a function of special centres, which may be accurately defined as *spinal vaso-inhibitory centres*, whereas the "resistive" power as observed connected with the convulsions is probably a function of still other centres.

2d. If strychnine thus produces a general vaso-motor constriction, it is certain that there must be a marked condition of anæmia of the spinal centres, and, consequently, when we remember that depression of function in all vitalized structures is the sequence of this condition, it is obvious that the tendency here, in so far as the circulation is concerned, is the very opposite to stimulation.

3d. There can be no doubt, when the testimony of Matteucci,[†] Moreau,[‡] Kölle,[§] Vulpian,^{||} and others is considered, notwithstanding the more recent and contrary assertion of Klapp (*loc. cit.*), that strychnine causes a paralysis of the motor-nerve trunks, for it has been noted that these structures are always found to be more or less paralyzed, and stimulus applied to the trunk will either elicit but feeble response or utterly fail; and it is, moreover, clearly determined that the nerve becomes functionally incapable, because when a galvanic current is applied to it, and no movement in the muscle evinced,

* Richter, *Zeitschrift f. Ration. Med.*, 1863; Schlesinger, *Med. Jahr. A. K. K. Gesellschaft der Ärzte zu Wien*, 1874; Klapp, *Jour. Nerv. and Mental Dis.*, October, 1878.

[†] *Traité des Phénom. Electro-Physiolog.*, 1844.

[‡] *Comptes-Rendus, Soc. Biol.*, 1855.

[§] *Virchow's Archiv.*, Bd. x., 1856, p. 239.

^{||} *Arch. de Phys.*, Nov. 1870, p. 125; *Martin-Magron and Buisson, Jour. de Phys.*, 1860, vol. iii. p. 340.

muscular irritability is found still to be intact if stimulation is directly applied. It has, however, been disputed whether strychnine acts directly on the nerve-structure to bring about this paralysis, or whether it is due to the strain of excessive use. Kölliker believes that the latter entirely accounts for it, because he found that when the nerve is severed it does not lose its functional activity as soon as the intact nerve; but that this conclusion is only partially correct, and that the drug is a direct motor-nerve poison, we have sufficient proof, especially in the researches of Vulpian (*loc. cit.*) and Martin-Magron and Buisson (*loc. cit.*); for it is found that the divided nerve loses its activity, although not so quickly as the intact nerve, and, furthermore, that when excessive doses are given the animals die without any convulsions whatsoever, and the motor nerves are found paralyzed.

In the light of our present physiological knowledge it seems incredible that a poison acting so decidedly as a paralyzant to the motor nerves would act consentaneously as even a more decided stimulant on a continuous structure, such as the motor centres of the spinal cord; and, certainly, if such an action were conclusively proven to be the case, we should have a physiological anomaly so curious as to be beyond precedent. But the keenness of the experimenter has been unable to differentiate to such an extent the phenomena which result from the workings of so intricate and complex a mechanism as the spinal cord as to say decidedly from whence and how all motor impulses originate, and as a consequence he is frequently obliged to assume that a given event is the result of a probable action on a specific portion of the cord; and as an illustration of this fact we have the present drug, which has been assumed to cause convulsions by stimulating the motor centres; but which, when we consider the depressed motor nerves, the apparent loss of a resistive power by which vaso-motor impulses play at will along the cord, and the anæmic condition of this structure and consequent tendency to depressed function, are more probably the result of a depression of the "resistive" power of the cord.

It seems as though we could add indirect though corroborative proof to this by alluding to the results of experiments with the ethyl- and methyl-strychnine com-

pounds. Brown* has shown that these compounds do not induce convulsions, but act like curare, and cause a profound paralysis of the motor-nerve endings. Hence it is believed by some that this new combination has so altered the action of the strychnine on the economy as to destroy its convulsant effects by converting it into a paralyzant instead of a stimulant; but when we consider the effect of strychnine itself on the motor nerves, and assume that it acts as a depressant to the "resistive" power of the cord, it seems evident, as Ringer and Murrell suggest, that when the strychnine is converted into an ethyl-compound its physiological action is not reversed, but only its chemical affinities so modified it that it affects the motor nerves relatively more powerfully and the spinal cord relatively less. As a consequence, the reason why convulsions do not occur is either because of the feebleness of its spinal action or because the paralysis of the motor-nerve peripheries becomes so rapidly advanced that they are unable to transmit motor impulses when the cord has reached the convulsant stage, or both.

Curare and certain other well-marked spinal depressants are sometimes observed to cause convulsions, which are usually preceded by paresis, more or less marked. Considering the above testimony, it is readily conceivable how any spinal depressant may give rise to convulsions; but if it is assumed that these phenomena are due to stimulation, we have a formidable difficulty to contend with in any attempt to explain how a drug can paralyze the cord and in the midst of it act as a stimulant sufficiently powerful to induce convulsions. The assumption of the existence of this "resistive" power of the cord—which I think can be better expressed by designating the portions of the cord in which this resistive power resides as the *spinal reflex-inhibitory centres*—makes an explanation of the *modus operandi* of causation of convulsions by spinal depressants easy, and effectually answers what has been for a long time a very perplexing question.

Strychnine, however, gives rise to convulsions at once, while the other drugs first induce a condition of paralysis. But Ringer and Murrell, in their masterly re-

* Trans. Royal Society of Edinburgh, xxv., part i. p. 251; and Journal of Anatomy and Physiology, 1868, vol. ii. p. 224.

searches, have given us an explanation of this in the fact that the difference in these results is probably dependent upon the degree to which a given drug affects reflex action; for, while some of them diminish it very materially, others, again, affect it little or not at all. They therefore assume that in strychnine-poisoning reflex action is unimpaired, while the resistive power alone is annulled; but in atropine-, box-, and gelsemium-poisoning reflex action is affected also, and, as a consequence, modifies the convulsant phenomena, both in the time of their occurrence and in their violence. In other words, the relation existing between the degree of the effect on reflex action and the resistive power of the cord determines the time and degree of the paralysis (if this is present), the early or late appearance of the convulsions, as well as the degree of their violence.

MEMBRANOUS CROUP TREATED BY PILOCARPIN—CHANGE IN THE COLOR OF THE HAIR FROM THE USE OF PILOCARPIN.

BY D. W. PRENTISS, A.M., M.D.,

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MUCH attention has been recently attracted to the use of pilocarpin in diphtheria by the report of its favorable action in that disease by Dr. George Guttman, of Cronstadt.

Dr. Guttman obtained very favorable results in the treatment of a large number of cases. His observation was to the effect, not that the drug exerted any specific action over the disease, but that it apparently loosened and softened the false membrane by its action upon the secretion of the mucous membrane, so that the false membrane was more easily expelled. His report was followed by one from Lax, who treated ten cases of diphtheria by pilocarpin exclusively, all of which recovered. Six of these were very severe, and in two death was expected nightly. Still more recently, Dr. Ed. C. Wendt, of New York, reports three cases (*Medical Record*, April 9, 1881) in which, after other remedies had failed, pilocarpin was given and recovery followed. On the other hand, however, Dr. Neumeister has published an account of twenty-eight cases of diphtheria treated by pilocarpin with rather unfavorable results. Five of the cases were

adults, and the others children. The adults seemed to be influenced favorably; but in the cases of the children thirteen out of the twenty-three died, and in eight bad effects of the pilocarpin were observed. Neumeister's conclusion is that pilocarpin is a dangerous remedy with children, and that its value in diphtheria is not sufficient to justify its use. In a disease so fatal as diphtheria,—especially that form known as *membranous croup*,—any remedy which promises to avert the usual distressing termination is welcomed with avidity by the profession. In the question under consideration the preponderance of evidence seems to be in favor of pilocarpin. The success of Guttman, Lax, and Wendt has been much more marked than that of Neumeister; nor have they observed any of the unfavorable effects claimed by Neumeister to follow its use. Undoubtedly pilocarpin is a powerful drug and capable of doing mischief, but my observation coincides with that of the first-named observers,—that its effects can be regulated and controlled.

The importance of the subject has influenced me to report the following case, in the hope that it may be an additional inducement to others to give it a trial.

Chas. S., aged 14 months,—a healthy, well-developed infant, of German parentage,—was fretful and complaining for several days previous to June 9, 1881; voice and cough hoarse. June 9 the voice was lost.

June 10, P.M.—First saw the patient. He was lying on the bed, restless, but objected to being disturbed; breathing loudly stridulous, voice entirely suppressed. On examination of the throat, the entire fauces were found covered with an ashy-white false membrane. Very little febrile disturbance. Prescribed a mixture of chlorate of potassium and tincture of chloride of iron internally, and a one-percent. solution of carbolic acid to be applied locally; also, in case the dyspnoea should increase, an emetic of turpeth mineral.

June 11, A.M.—Patient worse; dyspnoea and restlessness have increased; the emetic had not been administered; gave a dose (25 centigrams) while I was at the house. It caused free vomiting, with expulsion of several pieces of false membrane, and was followed by great prostration. So much difficulty was encountered in mopping the throat that it was discontinued, as was also the iron mixture. The following prescription was ordered:

B. Pilocarpin. hydrochlor., 0.02 gram;

*lac*us** lacti, 2 grams.

Plus in chart, no. x.

S.—One every hour.

Directions to repeat the turpeth mineral if necessary. Milk punch *ad libitum*.

June 11, P.M.—Condition about the same as in the morning.

June 12, A.M.—Condition no worse. Emetic of turpeth mineral during night. Dose of pilocarpin doubled.

June 12, P.M.—Patient better; has slept most of the day; stridulous breathing less marked; more cough, and cough looser; sweating and salivation very free; dose of pilocarpin reduced to the original amount.

June 13, A.M.—Still better; passed a comfortable night, sleeping all night; stridulous breathing gone; false membrane has disappeared from the fauces.

June 13, P.M.—Still improving; cough troublesome, but loose; aphonia still present.

June 14, A.M.—Still improving; slight return of the voice.

June 15, A.M.—All the symptoms decidedly better; appetite returning.

June 18.—Since last record the improvement has been steadily progressive. No longer any sign of false membrane, and the voice has returned. The bowels, however, are very loose. Pilocarpin discontinued, and a diarrhoea mixture ordered.

When I first saw this patient I considered the prognosis very unfavorable,—I might say almost hopeless. The child was in that state so familiar to us in advanced membranous croup. The result can hardly be attributed to the two doses of turpeth mineral taken, although portions of false membrane were thus thrown out. In numbers of other cases I have used this emetic, and never but once with favorable result. In the successful case referred to, the diphtheria had commenced in the fauces and extended to the air-passages. A complete cast of the trachea was twice expelled under the action of the yellow sulphuret of mercury. In the case now under consideration this did not occur. The improvement followed the administration of the pilocarpin, and was most marked when the action of that drug upon the system became decided. Its mode of action seemed to be by loosening and softening the false membrane, so that it was easily expelled by the act of coughing. The salivation and sweating produced did not distress the little patient, and were easily controlled. It caused a marked tendency to sleep.

A word in regard to the administration of jaborandi.

The most economical as well as the least elegant form is that of infusion. This, however, in dose of from three to

six grams of the leaves is sufficiently certain in its effects. The fluid extract of jaborandi is a more concentrated form of the drug, and, if freshly prepared, is reliable in doses of four grams. The solid extract may also be used in cases where it is desirable to give the medicine in pill form. But undoubtedly the most elegant as well as the most reliable preparation is the alkaloid pilocarpin, either as the hydrochlorate or the nitrate. Pilocarpin is the active principle. In using the leaves, the activity or efficient dose will depend on the proportion of the alkaloid contained, and this varies with different specimens. The best jaborandi comes from Pernambuco, Brazil, and is the product of the *Pilocarpus pinnatifolius*. Since the development of an increased demand for jaborandi, an inferior article has been put upon the market from the Argentine Republic, consisting of the leaves of another species of *pilocarpus*, which contain a smaller proportion of the alkaloid. The same uncertainty of strength would apply to the fluid and solid extracts. Their strength in pilocarpin would depend upon the quality of the leaves from which they are made.

In many cases where we are called upon to administer this drug the stomach is irritable and will not retain medicine. The pilocarpin salt is soluble and entirely unirritating when given hypodermically, and in the dose of one centigram (one-sixth of a grain) acts promptly, producing full dia-phoresis and salivation. For hypodermic use it is best to order it in powders,—one centigram each,—and dissolve in water at the time of using, repeating the dose hourly until the desired effect is obtained. As a general rule, solutions of all alkaloids are objectionable, for the reason that they are readily decomposed. In treating young children it is often difficult, and sometimes impossible, to administer the infusion of jaborandi, or even the fluid extract. The pilocarpin may be given in dose of from one to four milligrams (one-sixtieth to one-fifteenth of a grain), in powder with sugar, and is pleasant to the taste. I can, however, see no advantage in the combination offered by Dr. Guttman,—with pepsin and hydrochloric acid. It is best, unless there be good reason to the contrary, to keep prescriptions simple, especially where we desire to observe the action of a new remedy. For this reason I think the prescrip-

tion given above preferable to that of Dr. Guttmann.

CHANGE IN THE COLOR OF THE HAIR.

In a recent article (*Philadelphia Medical Times*, July 2, 1881) I reported a case in which a remarkable change occurred in the color of the hair of a patient while under treatment by pilocarpin. Having this in view, I took a specimen of the child's hair in the present case, in order to compare with the color later and see if any change took place. The case seemed at first so hopeless that the specimen was not taken until June 17, when the pilocarpin had already been administered for six days. The second sample was cut from the child's head on June 27, ten days later, care being taken to select a place corresponding to that from which the first sample was taken. The difference between the color of the two is not great, but is sufficiently marked to be distinct. The first specimen is a light brownish-yellow, and the second is a shade darker. I did not anticipate, in this case, any change in the color of the hair, because I did not think the pilocarpin had been taken long enough. The specimens, however, show a decided change, and I record it for what it is worth.

COMPOUND DISLOCATION OF ANKLE WITH FRACTURE OF MALLEOLI—EXCISION OF JOINT—RECOVERY, WITH USEFUL LIMB.

BY H. R. WHARTON, M.D.,

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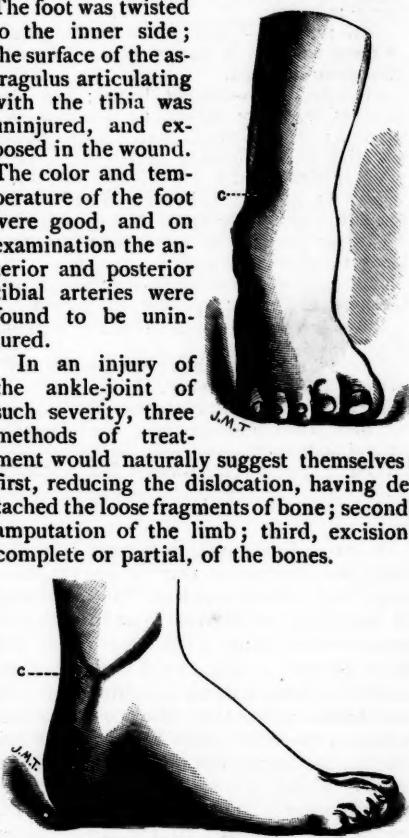
ON the evening of October 4, 1880, I was requested by Prof. Ashurst to see, for him, the following case in his ward in the University Hospital.

J. M., aged 15 years, while playing on some iron railings, fell, his left foot being fixed, and sustained a severe injury of the ankle-joint.

On examination of the injured part I found a complete dislocation of the tibia and fibula to the fibular side, the bones protruding for two inches through a transverse wound a short distance above the position of the external malleolus; the internal malleolus was entirely detached from the tibia, and remained in contact with the internal lateral ligament of the ankle-joint;

the external malleolus was fractured, and only adherent to the fibula by periosteum. The foot was twisted to the inner side; the surface of the astragulus articulating with the tibia was uninjured, and exposed in the wound. The color and temperature of the foot were good, and on examination the anterior and posterior tibial arteries were found to be uninjured.

In an injury of the ankle-joint of such severity, three methods of treatment would naturally suggest themselves: first, reducing the dislocation, having detached the loose fragments of bone; second, amputation of the limb; third, excision, complete or partial, of the bones.



The first method of treatment, I thought, might be set aside by the condition of the parts; compound dislocation with fracture, with the consequent dangers from tension after reduction. The second, amputation, I thought unquestionably the safest mode of treatment as regarded life, but it would have had the disadvantage of leaving the patient without a useful limb. The third method, excision, seemed to me, under the circumstances, the best, giving the patient a chance for a useful limb, and diminishing the dangers which follow the reduction of compound dislocations without excision.

The age of the patient and the uninjured condition of the arteries were important elements in favor of excision over amputation. The patient was etherized, when, having slightly enlarged the wound

downward, I divided the periosteum and separated it from the bones, and with a chain-saw removed one and a half inches of the tibia and fibula, leaving a small portion of the tibio-fibular articulation. The detached internal malleolus was now removed from the internal lateral ligament, to which it was adherent, and the foot brought into position without difficulty. The astragulus was not excised, as it was uninjured, and there seemed abundant room for drainage and relief of tension. The sawn ends of the bone were rounded with forceps and a drainage-tube introduced into the wound, which was closed with silver wire sutures. The wound was dressed with a laudanum dressing, and the limb placed on a bracketed wire splint, so that subsequent dressings could be accomplished without disturbing the parts.

The case after operation was under Prof. Ashurst's care; the wound healed by adhesion, except at the lower portion, where the drainage-tube protruded. The tube was removed about the tenth day, and the wound remained open and discharged slightly for several weeks. Several abscesses appeared on the fibular side of the foot, which were opened and continued to discharge for some weeks. The leg was kept on the wire splint for six weeks, by which time all sinuses left by the abscesses had healed. It was now removed from the splint and a plaster-of-Paris dressing applied, which was retained for four weeks.

On examining the parts after removing the plaster dressing, three-fourths of an inch shortening was found to exist in the injured limb; the configuration of the joint was not much altered, there having apparently been a production of new bone near the site of the malleoli; the patient also had a fair amount of motion in the ankle-joint.

The patient was discharged from the hospital in January, 1881, walking with a slight limp, and a month later was seen in excellent health, wearing a high-heeled shoe, but walking without any lameness whatever.

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THE LAST OF CHIAN TURPENTINE.—Mr. Hulke (*Lancet*, June 25) reports a number of cases treated by Chian turpentine in the cancer ward of the Middlesex Hospital, none of which were benefited in the least.

TRANSLATIONS.

TEMPERATURE OF CONTRACTING MUSCLES OF MAMMALS.—A summary of Dr. R. Meade Smith's interesting article on this subject (*Du-Bois Reymond's Archiv*, May, 1881), is as follows. The subject of investigation is divided into four sections:

I. The changes in temperature of the venous blood coming from contracting muscles.

II. The temperature of normal contracting muscle.

III. The share of the blood-current in the production of an increased temperature in tetanus.

IV. Heat-production in muscles with artificial circulation.

I.—The Changes in Temperature of the Venous Blood coming from Contracting Muscles.

In the first ten or fifteen seconds of a strong irritation of the crural nerve, the temperature may remain stationary or even sink from the initial arrest of the blood-current in contraction, then the temperature commences to rise rapidly, and in the first two minutes attains nearly or quite its maximum height. When the tetanus lasts longer than two minutes the temperature falls or may rise a little higher, but extremely slowly. At the end of the tetanus the temperature may continue to rise, even when the blood coming from the relaxed muscle is warmer than that flowing to it. This may be due either to a continued heat-production in relaxed muscle or to the fact that since the blood flows more slowly it has longer time to be heated up to the temperature of the muscle. In all instances the temperature of the venous blood reaches very slowly its height before the tetanus. The venous blood may become as much as 0.6° C. warmer than the arterial during a tetanus, and this, too, independently of the difference originally between the two temperatures: *e.g.*, when a second tetanus follows the first before the heating effects of the first have passed off, and while the venous blood is still warmer than the arterial, we have still an increase of temperature.

By estimating the quantity of blood flowing through the muscles in tetanus we have determined that at least as much as 25 to 75 heat units are removed by the venous blood from the muscle.

II.—The Temperature of the Normal Contracting Muscle.

The muscle mass at rest is usually 0.5° C. cooler than the artery, from loss of heat through the surface. The entire muscle is not of a uniform temperature, although in alterations of temperature all portions of the muscle are similarly and simultaneously affected.

a. The temperature of the muscle in different degrees of stretching.—The maximum temperature and the rapidity with which it is attained are, in the living, warm-blooded muscle, entirely independent of the amount of work done, thus contradicting the statement of Fick for the frog's muscle.

b. Relationship between changes of shape and temperature according to length and strength of irritation.—The changes of shape and of temperature cannot be said to be closely connected, since when we have the greatest contraction the (heat-production) increase of temperature may be slighter than in a weaker contraction: the same holds true as to actual heat-production. We may say that a stronger contracted muscle loses more heat. The muscle and venous temperature are invariably affected in the same manner. Therefore the excess of venous over the arterial temperature corresponds to the higher temperature of the muscle.

The temperature, and equally probably the development of heat, increases with the irritation, whether a corresponding increase occurs in the degree of contraction or not: so the generally admitted theory that the change of shape of the muscle and the development of heat are only different expressions of the same tissue-change, can no longer be admitted. We are not, however, thereby compelled to suppose the existence of two entirely distinct processes brought about by different nerves.

Ordinarily the muscle loses its heat-producing power before it loses its contractility. We may have a series of contractions of equal extent with a constantly diminishing heat-production in each.

"Contracture" differs from tetanus in the fact that in the former we have a rapid fall of temperature instead of the rise which occurs in the latter.

We may have an irritation strong enough to produce a decided contraction, and yet not strong enough to produce an elevation of temperature, while the results with in-

creasing irritations coincide with those of Heidenhain as to the frog's muscle, that the development of heat grows more rapidly with an increasing irritation than the contraction.

c. Relationship between the maximal temperature of the fresh and fatigued muscle.—The experiments under this section show how variously a muscle will behave as to heat-production after prolonged exertion. They go to show what a very slight connection there is between the two results of nerve-irritation, viz., the contraction and the heat-production, contradicting Heidenhain as to the fixed relation between heat-production and fatigue.

d. The after-working of the irritation on the actual temperature.—Heat-production may continue in a relaxed muscle, though this is not the rule.

III.—The Share of the Blood-Current in the Production of an Increased Temperature in Tetanus.

a. Comparison of the temperature of tetanized muscle in the bloodless and normal condition.—In the bloodless condition only a slight share of the chemical change could be attributed to the oxygen of the blood remaining in the vessels, as time was allowed for it to become deoxygenated. During a tetanus which does not last more than two minutes in a muscle deprived of its circulation, we can have as great an increase as occurs in the normal muscle. There is, however, a slighter degree of actual heat-production. After the second minute of tetanus the increase of temperature in the bloodless muscle becomes a fall, and by the fourth minute all the increase of heat may be lost, the capability of developing heat being lost from the modification of some part of the irritable apparatus.

The influence of the continually renewed blood on the heat-producing tissue-change is positively proved by the length of time the process continues in normal muscle compared with those removed from the circulation. When the blood-stream is closed in the middle of a tetanus there is a sudden fall of temperature, and again a rise when it is reopened. If, however, at the time of closure the irritation is increased, we have a rise instead of a fall. The capability of executing work is influenced by the closure of the blood-stream in the same way as the temperature.

b. The action of curare on muscle temper-

ature.—Here we can produce contraction with acceleration of the circulation. There is here even in rest a constant upward tendency of the thermometer: the muscle may become warmer than the artery. This occurs when the circulation is mechanically retarded through the muscles, while each new injection of curare causes a fall of temperature. On direct irritation of the muscle we have a rapid increase of temperature, which may last several minutes after the tetanus, as seen in the thermometer in the muscle. The increase is not so great or so rapid as when the nerve is irritated without curare. The thermometer in the vein after the tetanus shows a rapid fall. When the nerve is irritated in curare experiments we may have a fall of temperature by action on the vasoconstrictors.

c. On the cooling influence of the blood after reduction of the pressure by bleeding or section of the cervical cord.—After bleeding we have an increase of arterial temperature and an increasing inability of the muscle to contract through a long period: nevertheless we still have a decided increase of temperature in the venous blood during a tetanus, as was also the case after section of the cervical spinal cord.

IV.—Artificial Circulation through the Muscle.

Here a rise of 0.16° C., was noted even when the arterial fluid was 0.76° cooler than the muscle.

This fact opens a very promising future for direct calorimetric studies on contracting muscles, as their irritability may be preserved for several hours.

MALARIAL POISONING IN YOUNG CHILDREN.—In a clinical lecture on this subject (*Revue de Thér.*, 1881, p. 260) Dr. Jules Simon says that while intermittent fever, especially of the severe type, is often difficult of diagnosis in the adult, it is much more so in the infant, both because its signs are different and because these may vary with the age. In the infant under two years of age the malarial poison does not show itself with the same regularity as in the adult. The quotidian type is that oftenest observed, and frequently by day as well as by night. In the latter case the symptoms are the same as those of ordinary fever from sore throat or digestive trouble. There are certain signs, however, by which it may be recognized. At what-

ever moment the attack begins, it is sudden. The cold stage comes on so quickly and is of such short duration that it can scarcely be recognized unless one is prepared for it; the extremities are like marble, the pulp of the fingers shrivelled, the matrix of the nail blue, the eyes sunken, the cheeks and the end of the nose pale. Then follows the feverish stage for an hour or two, terminating by a short stadium of perspiration, affecting particularly the neck and chest. When the attack comes on at night, the child wakes suddenly, crying at an unaccustomed hour, and by the time he can be examined is already in the hot stage. For this reason it is easy to mistake the infant's condition for some commencing eruptive fever, dyspepsia, dentition, etc. The tongue, however, will give some indication if examined, for, if the trouble is malarial, a semi-lunar patch of rawness may be observed about its edge.

In the irregular forms the child, without actually having any fever, may be forlorn and refuse to nurse at one time of the day, taking the breast again at a later period. These infants cry if pressed upon over the head, eyes, or ears, because they suffer with multiple neuralgia. At other times only a slight sweating is noticed, or a little diarrhoea. Sometimes quinine must be given in doubtful cases before the nature of the malady can be made out.

Infants at the breast are not free from danger regarding the chronic poisoning of malaria, which develops a cachexia from which many succumb. The child's face assumes a waxy hue, he becomes thin, his legs and face become puffed, the spleen is hypertrophied, sometimes to a considerable degree, and death often occurs in syncope, convulsions, or coma. If the infant survives, a treatment extending over years may be required to restore him to perfect health. The pernicious forms are similar to those observed in adults.

In children from two to six years of age, the attacks are more marked, if possible; they are tertian or double tertian, and are more apt to occur during the day than during the night. They may simulate typhoid fever or meningitis. Simon also mentions one curious case presenting torticollis, apparently dependent upon Pott's disease of the spine, only it returned daily at the same hour, and disappeared under the use of quinine. At other times persistent bronchitis may be observed, rebel-

lious to all medication, and only yielding at last to quinine. Now and then rachialgia of a periodic character is observed, with congestion of the meninges, causing atrocious sufferings, in the form of fulgurating pains in the limbs, with contraction.

The prognosis is serious, except in light cases. Sometimes quinine has to be given for years. The pernicious form is always fatal.

Sulphate of quinia is of course the treatment in all these cases. Up to two years of age $\frac{3}{4}$ grain to $2\frac{1}{4}$ grains may be given in little granules of $\frac{1}{6}$ grain each, which the infant can easily be made to swallow. Enemata containing three to four grains may be administered, or the same amount by inunction. In the pernicious forms the following solution is to be given in the space of an hour:

R Quiniæ sulphat., gr. iij ad ivss;
Tr. opii (Sydenham.), gt. j;
Sol. sacch. alb., gtt. c.

In older children, from two to six years, the dose should be three to four and a half grains in sweetened glycerin with syrup of tartaric acid, and when the attacks are violent three-quarters of a grain may be given every hour until toxic effects are produced. If the child refuses to take the solution with glycerin, the quinine may be given in coffee or in one-sixth-grain pills in some confection.

In the chronic malarial poisoning of infants at the breast, change of air, with the administration of iron and arsenic to the nurse, may be prescribed. Above two years the treatment must vary with the case. Sometimes coffee may be given, also maceration of quinia; at other times arsenic, phosphate of lime, hydrotherapeutics, sea-bathing. Purgative and all other enfeebling treatment must be avoided.

LATE HEREDITARY SYPHILIS.—At a recent meeting of the Société de Chirurgie (*La France Médicale*, 1881, p. 675) Dr. Lannelongue remarked on the osseous troubles which show themselves during the later stages of hereditary syphilis, and which, according to their origin, manifest themselves as subacute inflammation of the bone and as periostitis. The enlargement of the bone assumes the form of periostoses and hyperostoses, and it may result in augmentation of volume and also of length. The seat of the hyperostoses is the diaphyseal region in the neighborhood of the apophyses,—a point where nutritive ac-

tivity is at its highest. From this region this neoplastic action is propagated along the diaphyses, following a central or peripheric course. It may include as much as ten to fifteen centimetres of the length of a long bone. The ultimate evolution of these hyperostoses gives rise occasionally, as in the adult, to abscesses and exfoliation of bone. It leaves behind it in every case singular and permanent deformities, which treatment is powerless to cure. These deformities present a peculiar physiognomy easy to recognize. The bones most frequently affected are the tibia, ulna, radius, femur, and humerus. The mixed treatment, thoroughly carried out, cures these cases when early seen. When the deformity has actually occurred, only the prevention of further extension can be hoped for.

A NEW EXHILARANT.—Dr. Luton, of Rheims (*Bull. Gén. de Théráp.*, vol. c., 1881, p. 254), calls attention to the curious exhilarant properties of a mixture of tincture of ergot with phosphate of sodium, which he recently discovered by accident. The effects of this mixture can best be compared to those of nitrous oxide gas, but are of a more permanent character, lasting from an hour or two to several days. Patients show signs of hilarious but slight intoxication. Saturnine and melancholy individuals laugh, joke, and display the utmost gaiety. Dr. Luton considers the medicine to possess a certain value in cases accompanied by melancholia, in the neurotic algidity of hysterical persons, and in the anaemia of chlorotics. A convenient formula is the following:

R Tincturæ ergotæ, 3j \mathfrak{D} j;
Sol. sodii phosphat. (10 per cent.), f3iv.
Mix in a quarter of a tumbler of sweetened water, and take at one dose before eating.

LOCOMOTOR ATAXIA.—Prof. Pitres, in a lecture on this subject (*Revue de Théráp.*), formulates the following statements. 1. Sclerosis of the posterior columns always begins with sensory disturbances. 2. The painful symptoms almost always present a peculiar aspect, which allows an early diagnosis to be arrived at (their fulgurant, intermittent, irregular occurrence). 3. The pains may be located in any part of the body (limbs, face, viscera, vertebral column). 4. They precede the motor disturbances by months or years. 5. They may for an indefinite period constitute the only symptoms of ataxia, which in this case deserves the designation *tubes*.

PHILADELPHIA
MEDICAL TIMES.

PHILADELPHIA, AUGUST 13, 1881.

EDITORIAL.

EYESIGHT IN THE PUBLIC SCHOOLS OF PHILADELPHIA.

THE report of the committee of the County Medical Society on examination of the eyes of children in the public schools of Philadelphia, which appeared in our last issue, contains facts and conclusions so interesting and important as to merit the careful attention, not only of physicians, but also of the intelligent public generally. Too little importance has heretofore been attached to the conditions of study in relation to the preservation of eyesight, and, although the attention of parents and instructors has in recent years been drawn more and more to the subject, yet, from the necessity of the case, this interest has been that of inquiring ignorance asking for that guidance which it is clearly the duty of the medical profession to furnish to the community at large.

The desired information has now been at least to some extent obtained, and, although the investigations of Dr. Risley's committee were not extended over as great a number of cases as might have been desired, yet, from the results of examination of some twenty-four hundred eyes in children attending all grades of the public schools, a fair estimate may be made of the conditions of eyesight prevalent among the school-children of Philadelphia.

The conclusions drawn are to some degree unexpected. Thus, for example, it has been generally thought that improperly lighted school-rooms were perhaps the chief factor in the production of weak eyes; and more and more attention is being paid to this subject by the school authorities. But, as Dr. Risley points out,

other causes are also at work, among which are the habit of reading and study carried on at home to an excessive degree and under more or less unfavorable and injurious conditions; the custom of sending children to school at too early an age (which the investigations of the committee show to directly favor the occurrence of defective vision), and chiefly the pre-existence of more or less abnormal eyesight. To this, perhaps, may be added the use of books improperly printed on poor paper and with defective type. While we believe the books in use in our schools are usually of the proper kind in this respect, yet the prevalence and popularity of those cheap but abominably printed editions of standard authors must unquestionably exert a pernicious influence on the eyesight.

The conclusions of the committee—to the careful perusal of whose report we urge all medical men who may be personally or officially connected with the mental training of our citizens of the future—point directly to the following measures which should be carried out if the subject of eyesight in the public schools is to receive the attention it demands.

1. The proper lighting and seating of our schools should receive the earliest attention, with the view of remedying well-known existent defects and preventing for the future those errors in architectural construction which exist in present school-buildings.

2. Children should not be permitted to enter school at a too early age.

3. *A careful examination should be made of the eyes of all children on entering upon school-life, and such precautions should be taken as to correct or prevent injury to the eyes from study.*

4. Parents should be warned of the harm and injury which may result from over-study and especially from excessive reading at home, and they should also be told to take heed to the conditions of light

and position occupied by children during their hours of reading and study.

It is the duty of the medical profession to urge these views on the community at large as occasion offers, with the hope of influencing public opinion.

CORRESPONDENCE.

LONDON LETTER.

So far as unwonted heat will permit, we are all in expectation, and the bustle expectation gives rise to, about the forthcoming International Medical Congress,—getting ready, but impeded by prostrating tropical heat. It is expected to be a monster affair, and units are coming from all corners of the earth, till aggregated units will constitute hundreds. So far the arrangements seem to be well laid out; but what the actual accomplished results will be, time will tell. Of course, already there are heart-burnings and envyings: somebody is more prominent than he ought to be, while somebody else is unduly thrown into the background who feels that he is an ornament to the profession who ought to be made the most of. It is rather humiliating to think how small humanity can be at times, how little matters can perturb the mental processes of even educated men. Granting a prominent position can be secured, how does the aspirant know that this is not going to be a misfortune rather than an advantage, if the execution is not thorough? This anxiety for prominence amidst the mediocrities is one of the curious features of human middlingness,—that it has not the wit to remain in obscurity, but moves its little macrocosm to place it where its incapacity will be only all the more conspicuous. Of course there are also a number of most competent individuals engaged in it, who will "pull the thing through" despite incapable colleagues. The promise of attendance by foreign celebrities is most encouraging for a capital meeting. With Sir William Jenner, K.C.B., at the head of English medicine, the home section will hold its own successfully against all comers. If our capricious climate will only just be accommodating, I think we will get through the ordeal fairly successfully.

In medical circles here great interest is felt in the progress of President Garfield towards convalescence after his most serious accident. The prevailing impression is that the medical part of the matter has been conducted with consummate skill, reflecting the very highest credit upon American medicine and surgery. Of course all recognize the admirable constitution and indomitable courage of the patient,

which are of so great moment in such an injury, and without which all therapeutic measures would be of little or no avail. The absence of high fever and of considerable peritonitis is a feature of the case as unusual as it is interesting. The published temperatures in our papers have been curious instances of error, which must occasion great perplexity in the minds of those who are more interested in than familiar with medical details. For instance, one day when the wounded man was reported to be doing well, the temperature was given as $106.6-109$, which certainly was a mistake of the printer or the telegrapher; but a day or two later, when further satisfactory progress was announced, the temperature was stated to be 109.9 . Now, this last is a temperature which is regarded as incompatible with life, though one or two isolated cases are on record where such a temperature has been recovered from. But as to the ordinary experience of humanity, the first temperature indicates a very grave condition, while the second would necessitate the most active steps being taken to secure the completion of that voluntary offering intended to provide for his wife and children if the worst should be realized. Of course no material harm is done to anybody by such careless errors, but there is enough incorrect information about, without adding to it. Much interest, too, is felt in the means which have been adopted to lower the temperature of the room during this terrific heat-wave which we all are experiencing. Such measures have an interest for every medical man, and will be made an addition to the armamentarium of every practitioner in hot weather. The difference of a degree or two is of moment in critical cases, and every one who has had personal experience of a temperature over 109 Fahr. knows well enough the significance of that degree or two as regards the subjective sensations. The whole case, indeed, is most instructive. One was taught that wounds of the abdomen were almost certainly fatal; and yet here is a patient scarcely feverish, and free from any serious peritonitis, who carries in his abdomen the comparatively large bullet of a "California bulldozer" fired at a short distance. As said before, the whole case reflects much credit upon American medicine; and the lesson ought to bear lasting fruit, even if no heroic medicinal measures were adopted. The moral control of the case has been, of course, a very important matter; for if a patient seriously ill is surrounded by a number of persons, all of whom speak to him and treat him as if he is dying—well, he very likely will die. This is a matter not nearly sufficiently estimated, and many a patient owes his life to the disposition of his medical attendant. It is not merely enough for a doctor to visit his patient and take careful note of how he is; something more is desirable; viz., he should lend the patient a little of his

own cheerfulness. His advent should be looked for, and he should be welcomed as bringing good fortune with him. There never was a consultant in large and successful practice who was not of a cheerful disposition. For is not the indirect encouragement given to a patient by a cheerful demeanor and an inspiring tone of voice often one of the most vitally important factors of the management of the case? On the other hand, certain relatives are death to the sick. If Peter Featherstone, in "Middlemarch," had had an ailment which permitted of recovery, or even of a temporary rally, he would have had no chance with his brother Solomon, or his sister, Mrs. Waulé, to say nothing of his nephew, young Cranch. With three such enlivening individuals as allies, grim Death would carry off the best of us, if ill. So it is with other persons when ill. If they are surrounded with cheerful persons, they have a fair prospect of pulling through. But let them be encircled by moping or dolesome relatives, and their chances fade out quickly. In old Peter Featherstone's case, of course these relatives were furthering their own ends by thus depressing the little life that was left to their unamiable relative, whose very breath they seemed to grudge. But in the majority of instances these "kill-joys" are such unintentionally, and not by design. They are people of an unhappy temperament,—oppressed, too, with a sense of seriousness at the emergency very often. But they are murderous all the same. Some medical men, too, have a depressing temperament and manner with them which is lethal to their patients in any emergency. There is one such man well known in London. It is said of him, "But his patients all die!" Yet he is an able man, as is demonstrated by his written works. He is also an F.R.S. He is a finished gentleman. But he is not cheery, and he is only partially successful in proportion to his intellectual deserts. A very fashionable physician is, on the other hand, a cheery man; his tone of voice and accent are encouraging; the patient feels the better for seeing him, and naturally is glad to see him. Such a man is a godsend to patients when life and death are nearly evenly balanced and the tones of a voice may make all the difference. No wonder he gets large fees, for he deserves them. Stories are told of large sums being given him merely to visit a dying man where no hope of any improvement was entertained, but merely to cheer him with a chat. Such a presence in a sick-room breathes life into a patient, inspires him with hope, and results in his recovery, if that is among the list of the practically attainable. An observant, thoughtful medical man always looks to the individuals around a sick person, and weeds out the undesirable ones. Of course they object. But, fortunately, the fitness of relatives for nursing an invalid is an exploded notion. The tie of

blood does not constitute a qualification for a sick-room, and though such frank expression may be an offence to certain personages who like to make their way into a sick-room, it is perfectly justifiable. Why in the name of common sense has a sick person to die because some gloomy-minded individual determines to nurse him? The growth of professional nurses is largely fostered by this constitutional unfitness of temperament for nursing on the part of some relations. The doctor can secure a cheerful nurse, fortunately, for nurses can be got on demand. But persons must put up with their relations; there is no changing them! And, if unfortunate enough to be seriously ill, they must take their chance with them. These croakers flock to the sick-room as gloomy as ravens. They resent any hint that they are not felt to be essential. They have come to fulfil a duty; and they are going to do it. Yes; and, if the doctor cannot succeed in getting rid of them on some pretext or other, they will persist in doing their duty till the funeral is over. Family affection is a beautiful topic for the sententious, but in a sick-room it is often an unmitigated misfortune for the sick person. The middle-aged woman, whose face is the reflex of her thoughts, and who is given to speak a word in season, whose bombazine dress is an outward indication of her unfitness to be near a person who is seriously ill,—she is simply a death-warrant incarnated. I respect her motives, but I question her suitability for her self-elected mission. A more dangerous association for a case of serious illness it is difficult to imagine. Such a female on the premises darkens the prognosis woefully. If she cannot be got rid of, the patient's existence is merely an affair of days. Get her away, and a cheerful nurse with a pleasant voice and a light hand in her stead, and the patient's prospects immediately brighten. A pious widow with dyspepsia and strong religious convictions is a ghoul when illness is about. She sucks the life out of an invalid like a moral vampire. As life ebbs she is sustained, and when the invalid has passed the portals of another world she goes away edified, strengthened, and encouraged in her murderous mission, fully prepared to extinguish the life of any number of relatives, if ill-luck should prostrate them on a sick-bed. Yet she is devoted to her ghoulish mission. She is as convinced of her moral right to intrude herself upon her dying relatives as were old Peter Featherstone's "blood-relations, who naturally manifested more their sense of the family tie, and were more visibly numerous, now that he had become bedridden." Their obtrusiveness was not to be snubbed, and Solomon was spokesman for near kith-and-kin when he replied, on being ordered out of the room, "I shall be down-stairs, brother, whether or no. I shall do *my* duty, and it remains to be seen what the Almighty will

allow." Now, such a family demonstration may seem very absurd in your country, but it would not be in any opposition to a North-country experience, when serious illness developed. Ties of blood then became visible which ordinarily were occult; and when the funeral finally arrived, the group entitled to sit in the bedroom where the coffin lay represented the furthest development of the blood-tie, in many instances only known to exist by these periodical appearances when the undertaker's sad task called the relatives together. A sad demeanor, a suppressed manner, funereal tones, are appropriate enough when the opportunity of showing respect to a distant kinsman by being present at his obsequies calls them forth, and then are harmless; but if allowed previous to this event they are decidedly homicidal. Nevertheless, it is sometimes part of the duty of a consultant to banish certain objectionable individuals from a sick-room; and very injured the ejected look when the sentence is carried out. At other times it is not moral but physical or intellectual unfitness that constitutes the bar, —a heavy foot, a clumsy hand, an officious manner, a harsh voice unmodulated to meet the ear of the sick person, or well-intentioned willingness linked with lack of foresight, and consequently doing fifty things far better left undone, and keeping the sick-room in a perpetual turmoil instead of that orderly quiet which is so sedative and conducive to repose.

It is impossible not to feel that the successful issue of this remarkable case is due to the aggregation of all these factors: (1) an admirable patient; (2) circumspect, intelligent medical attendants; and (3) rational, well-behaved, self-controlled relatives, who, whatever they might feel, maintained a perfect composure of manner. Under such an aggregation even a wounded peritoneum has conducted itself admirably, and demonstrated how in recent times this large serous sheet can tolerate injuries to it without actively resenting them. Certainly the case in all its details is one of great scientific interest, carrying with it a message to all time. What amount of the success so far attained is due to the adoption of Lister's principles of local treatment, it is difficult to say; but it clearly seems entitled to some portion of the credit. The antiseptic seems to render innocuous the decomposing particles of the tissues actually killed by the impact of the bullet, which otherwise is such a grave source of danger. Where the bullet is actually lodged is only a matter for speculation; but, wherever it is, it seems to be exercising no injurious influence. Indeed, if it be unaccompanied by any particle of clothing, as seems the case, the leaden missile may become encysted by a capsule of connective tissue, and may be thus rendered inert and devoid of harmfulness, never making its presence felt during the rest of President Garfield's existence, which we all trust will be a

prolonged one. The good feeling displayed by the sympathy with the wounded man and his family, evidenced on all sides and among all ranks of life here, will do much to cement the union betwixt two large peoples speaking the same language, as its wide issue; the success of the case will, as a minor issue, demonstrate the claims of American surgery to the respect of all. Because we in Europe see the American visiting us in his brief holiday, working hard, seeing everything, evidencing an ardent thirst after information, carrying away with him everything it is possible to secure, it will not do to imagine that he has nothing to tell us in return if he chooses to assume the rôle of teacher rather than that of student. Otis and Sayre have recently put the Britisher up to a thing or two; albeit their lessons have only been very imperfectly imbibed in a considerable proportion of cases. When the representatives of medicine and surgery assemble next month, there is every reason to hold that the delegates from the United States of America will have no cause to hide their heads at the position they will take in the mighty Congress. Of course there are probably many men on the Continent, as there undoubtedly are here, who are unfamiliar with the work done in the New World, who will be surprised at anything advanced in the United States of America, except the construction of revolvers and amusing newspaper paragraphs, or gigantic schemes for the transference of money from one pocket to another, and to whom Barnum, Colt, and Jay Gould or Jim Fiske are the best-known names. But instead of such ignorance being a matter to be proud of, as was not so very long ago the case, the better informed now show in their familiarity with matters American a spirit of appreciation which will develop further with time.

J. MILNER FOTHERGILL.

PROCEEDINGS OF SOCIETIES.

PHILADELPHIA COUNTY MEDICAL SOCIETY.

A CONVERSATIONAL meeting of the Society was held at the Hall of the College of Physicians, Philadelphia, May 25, 1881, Dr. Albert H. Smith, President of the Society, in the chair. Dr. Wm. M. Welch read a paper on "Vaccination" (see page 705), which received a vote of thanks and led to general discussion.

DISCUSSION.

Dr. Henry H. Smith said that physicians generally should pay more attention to the method of vaccinating and to the course of the vesicle, in order to see whether it passes regularly through its different stages of devel-

opment in a typical manner. In order that vaccination may be effective, the virus should be introduced under the skin in a state of solution.

Dr. Ludlow agreed with the last speaker, and insisted upon the umbilicated character of the vesicle as a diagnostic point. He believed that many persons presumed that they had been vaccinated when the procedure had not been properly performed and was not protective, and referred to the fact that some have to be vaccinated a number of times before it would "take." Occasionally the papule is delayed for several days—even ten days—before it shows itself after vaccination.

Dr. Wm. P. Moon referred to a limited outbreak of smallpox in a public hospital, and the measures taken to control its spread. On the 9th of December, 1880, a patient, and on the succeeding day a servant, in the female department of the Pennsylvania Hospital for the Insane were discovered to have a severe attack of variola. Both were sent to the Municipal Hospital. On the 17th of December, 1880, a case of varioloid occurred in the person of the steward's wife. From that date to the 6th of January there had occurred thirteen cases. The hospital consisted of a central building with north-and-south wings, the latter of which was carefully isolated, and the cases were in this way confined exclusively to the south side of the house. Vaccination and revaccination were practised. Only seven or eight cases had not been previously vaccinated. Three hundred and sixty-two in all were vaccinated, one hundred and fifty-two on the south side and one hundred and ten on the north side. In the series of one hundred and fifty-two revaccinations, ninety-four took. Of these, eighty-four were vaccinated for the second time, twenty-six the third time, six the fourth time, three the fifth, and one the sixth. Out of the one hundred and ten on the north side, ninety-five were revaccination cases, nine second, two third, leaving only four which did not take of this series.—so reported by Second Assistant-Physician Henry B. Nunemaker, M.D.

The appearance of smallpox in a hospital situated as this one is caused much anxiety for its results; but, owing to the care in isolating patients, the endemic was confined to one side of the house. There was ample room for treating the cases. The centre buildings were vacated, and communication shut off from the two sides. Two cases occurred in the centre building, but no others after these had been removed to the south side.

Dr. Wm. T. Taylor said that he did not hesitate to vaccinate women during pregnancy, and reported a case where it seemed also to protect the infant. A young lady was taken with varioloid; in the same house there was a woman six months pregnant, who was at once vaccinated and escaped the disease. At the end of utero-gestation a brother

of the lady was lying in an adjoining room sick with smallpox. The speaker vaccinated the infant again and again, but it would not develop. Nor did it take the smallpox. The question is, was the child protected by the vaccination of the mother during pregnancy? As regards the mode of vaccination, for the last fifteen or twenty years he had vaccinated with the needle (tattooing), using humanized virus, except occasionally when he used an ivory point. Softening the lymph-crust to the consistency of cream, it is put on the arm reddened by previous scraping, and with the needle it is pricked in fifteen or twenty times. This generally succeeds. For many years he used the crusts occasionally, keeping them for months. Lately he has commenced the use of animal virus. He also mentioned a case which had been vaccinated a number of times without any effect, as an instance of natural immunity from vaccination.

Dr. Benjamin Lee said that in a paper previously read before this Society, in 1872, one of his conclusions was that bovine lymph was not quite so lively, the human system was not quite so susceptible to its influence as to humanized virus; but his experiments had been made with bovine virus imported from Germany in hermetically-sealed tubes, which, perhaps, had lost some of its properties. The providing of lymph should not be left to private enterprise and speculation, but every large centre of population should have a vaccine farm, and no virus should be sent out without official approval. It is not likely that we shall ever return to humanized virus. It is therefore of great importance that bovine virus should come clothed with some authority.

The lecturer had said that a vaccination might be protective and yet not pursue a typical course. He inquired what would be the test by which this might be known.

Dr. Jas. K. Collins said that twenty-five days before he had vaccinated a baby three weeks old with a bovine point obtained from an apothecary. On the fourth day the spot was red; on the tenth day a crust had formed, which fell off on the twenty-first day. Shortly afterwards he was called to see another member of the family: the child was perfectly well. On the same evening she was seized with opisthotonus; occasionally her jaws were tightly shut. She died at five o'clock the following morning with tetanus. It is the first case of the kind that he had ever met with. There appeared to be no other evidence of injury than the vaccination. The case seems unique, as he had not been able to find a parallel case.

Dr. W. R. D. Blackwood insisted upon the proper performance of vaccination, and endorsed the methods proposed, preferring in his own practice scarification,—dipping the point in water, shaking off the surplus water,

then rubbing the virus on the scarified portion for a minute or two. He reported a case in which a pregnant woman (eight months) was protected by vaccination, although smallpox was in the same house. The infant never was vaccinated, but has since passed through an epidemic safely. He was therefore satisfied both that vaccination was protective after exposure and that vaccination in the later period of gestation also protects the child. He has not now used humanized virus for many years, except by special request. In using a crust he invariably pulverizes it in a mortar, and sees that it is perfectly dissolved before using it. He believed that he had seen two undoubted cases of syphilitic infection by vaccination.

Will vaccination take on those who have had smallpox? In a case of a girl eight years old, with well-marked pits upon her face, he successfully vaccinated, leaving two well-marked scars upon the arm. In a public institution he had vaccinated two hundred and thirty-four cases of all ages up to sixty and one hundred. Some of the revaccinations had typical scars just as much so as in the infants.

Dr. M. O'Hara thought that the exact value of vaccination as a protective against the smallpox cannot be estimated. He had seen people die in a second attack of smallpox. A physician died at the hospital in the third attack. We should not, therefore, ask too much from vaccination. Some persons are insusceptible to both vaccination and smallpox. Another element of doubt is the epidemic constitution of the air, which greatly affects the spread of the disease and its malignancy. He believed that much work was yet to be done in compiling the statistics of the Board of Health, in order to find out how many deaths have been prevented by public vaccination. A great amount of work had been done, and he would like to have this evident in the diminution of the death-rate.

Dr. S. K. Baldwin corroborated the remark made by a previous speaker in regard to obtaining typical vesicles in old people, even in revaccinations.

Dr. Wm. S. Stewart said that he had reported a case of supposed smallpox to the Health Office, but was told that she could not be taken to the hospital until the eruption showed itself sufficiently to enable him to be positive. He believed that the patients would do better if they could be moved earlier. He endorsed all that had been said in the paper. He had seen a case where a mother had an attack of confluent smallpox. The child was vaccinated, and, although nursed by the mother, did not have the smallpox.

Dr. Albert H. Smith had been educated in the school that believed that vaccination of pregnant women was little less than homicide. Having seen a case of varioloid terminating fatally after miscarriage at about

six and one-half months, he made up his mind to vaccinate every pregnant woman where exposure had occurred, and he had since done so up to the present date. He had seen no more fatal cases since he had adopted this plan, which he highly recommended, as the danger is so much greater from variola in this condition that we are warranted in running the risk of the vaccination. His experience had been considerable, and he had never seen the slightest evidence of any disturbance of the ovum, nor threatening of miscarriage. This is a subject of vital importance, because the pregnant woman will probably die with variola if unprotected.

His experience in regard to children was different from a former speaker's. He had never failed in primary vaccination in young children. He has used bovine virus invariably for a number of years.

Dr. Arthur Meigs said that the lecturer had not stated how many insertions he was in the practice of making in vaccination, and, in the second place, in the revaccinations he had not said whether it was performed only once or more than once; in the third place, he would inquire whether a person insusceptible to vaccination could be regarded as safe from an attack of smallpox.

Dr. W. H. Parish endorsed the statements in regard to the comparative safety of vaccination of pregnant women. He had in no case seen any inconvenience resulting.

Dr. Frank Woodbury said that as a test of successful vaccination the method of double insertion had been recommended,—that is to say, the virus is inserted twice, with an interval of a day or two between. In a successful vaccination the second vesicle will catch up and develop simultaneously with the first. He thought that this simple method might be more frequently practised. In regard to the work of the public vaccine physicians, he believed that, instead of the supply of lymph being left to individual enterprise, the city authorities should take especial pains to supply the vaccinators with genuine bovine virus. Perhaps part of the failure which has been claimed to exist is due to want of proper care in the selection and use of the material they employ in vaccinating. He also referred to the present epidemic of smallpox and to the unsystematic and inefficient means adopted by the Board of Health to prevent the spread of the disease, and also to the inadequate accommodations for conveying patients to the hospital. Practically, no restrictions have been placed upon those cases of smallpox which are reported by their attending physicians as being cared for at home, nor upon their attendants. Visitors to the smallpox hospital also come and go in the regular street-cars without hindrance. Very imperfect, dilatory, and unsatisfactory measures have been taken for the disinfection of wearing-apparel and bedding, or infected pre-

ises. The manner of conducting patients to the hospital is lacking in humanity, often injurious to the patients, and extremely discreditable to a great city like Philadelphia. Cases were mentioned where patients, instead of being carried directly to the hospital, were carried in the ambulance for several miles out of their road in order to pick up other patients, to their great injury, and increasing the risk of infection in case a mistake in diagnosis had been made. Moreover, no physician is sent with the ambulance, and the responsibility of making the diagnosis is thrown upon the ordinary physician who may happen to be called in. Thus it happens that patients are not reported for removal until the eruption is fully out, and they are subjected to the risk at a time when their disease is at its height, and when the danger is naturally greatest. A case was also reported in which a respectable woman was attacked by variola, and was ordered to be sent to the hospital by her physician on account of the supposed better accommodations, although she had a comfortable home. When the ambulance arrived, it was found that it already contained a burly negro covered with smallpox eruption,—the most repulsive object that could well be imagined,—and the husband was required to carry his beloved and still conscious wife down-stairs and deposit her by the side of the other patient. Thus was she dragged away. He never saw her again, for she died in the pest-house; but he will never forget her parting look, nor this gross insult put upon him by the carelessness or parsimony of some one in authority. In conclusion, Dr. Woodbury contended that during such an epidemic as we have just passed through, house-to-house visitation by public health officials is imperatively demanded, who should be clothed with authority to isolate the sick, or, what would be better, order all cases at once and without exception to the hospital for treatment; and, further, that enough ambulances should be provided to allow of the carrying of patients singly and directly to the public hospital.

In connection with the last case it was also said that after exposure the whole family and the speaker himself were promptly vaccinated with bovine virus obtained from a regular dealer, which was supposed to be reliable, but was utterly worthless. It not only afforded no protection at all, but gave a false sense of security and prevented genuine vaccination from being practised.

Dr. H. F. Baxter said that much of the bovine virus is bad. He had used it, and he had never seen a typical vesicle. With humanized virus he had vaccinated six or seven thousand cases successfully, and had only been able to trace a single case of varioloid occurring in all these cases.

Dr. W. M. Welch, in closing the debate, spoke of the importance of introducing the

lymph in a state of solution, the surface being prepared by slight scarification with a lancet. He believed that since the introduction of bovine virus (1870) there has occurred some change in the course of the vaccine pustule. Some years ago, with long-humanized lymph, the scab would fall off, or could easily be taken off, on the fourteenth or fifteenth day; now the crusts remain often until the fourth week, and sometimes longer. There is therefore some difference in its course, but whether or not there is any variation in the protective power there is room for doubt. In regard to the local effects, he did not think that a great amount of inflammatory action makes the vaccination more protective. Concerning insusceptibility to vaccinia, he believed it to be rare, but spoke of one case where he had failed after several attempts at primary vaccination, and subsequently, during an epidemic of smallpox, he tried it again, and succeeded in vaccinating the child. He had admitted patients vaccinated in infancy into the hospital with smallpox, who had been exposed to the contagion some years before without contracting the disease. If, therefore, it is true that persons may be susceptible to vaccination or smallpox at one time and not at another, is it not wise to vaccinate all persons, whether or not previously vaccinated, during an epidemic prevalence of the disease?

As regards successful revaccination, those subjects who are vaccinated within the first year of life are more apt to be successfully revaccinated at puberty than children vaccinated at a later age. He approved of vaccination, when necessary, during pregnancy, and believed that a child born under such circumstances might possibly be protected against smallpox or vaccination, though, in his opinion, this would not be the rule. Abortion very frequently occurs as the result of smallpox in pregnancy, but not always. He had kept records of some cases that went on to full term afterwards, and the child bore no marks of having undergone smallpox *in utero*; and he had never failed to obtain a characteristic vaccination. But cases have been reported where the child has survived an attack of smallpox *in utero*. Such a child would doubtless be insusceptible to vaccination. A case of miscarriage recently occurred in the hospital, in which the fetus showed an unmistakable vesicular eruption on all parts of the body. If, therefore, the fetus may have smallpox, may it not also be protected by vaccination of the mother?

While the bovine virus now obtainable, for some reason or other, much more frequently succeeds in inducing vaccinia than that which was in the market some years ago, it is still to be feared that much of it sold as genuine is spurious and unprotective. Dr. Martin, of Boston, in reply to a letter, wrote to the speaker that there is a great deal of spurious lymph in use, and said that many of the so-

called "cones" are particularly bad, being made up largely of dung, urea, hairs, epithelium, and only about five per cent. of animal lymph. They sometimes succeed, but more often fail, or produce spurious results.

In cases apparently insusceptible to vaccination by ordinary methods, Dr. Welch recommends fresh eight-day humanized lymph or arm-to-arm vaccination. This he has always found to be successful. Very few persons are naturally insusceptible to smallpox. He mentioned a case exposed in the hospital, and without any vaccination scar, who could not be successfully vaccinated, and who did not take smallpox; but such cases are entirely exceptional. As regards the protective power of vaccination, he was fully convinced of it. Families are often sent to the hospital, some of the members having smallpox and others well and unvaccinated: the latter, being vaccinated after admission, not unfrequently are protected against smallpox, although daily exposed to it. But, unless the vaccination gets a certain start of the disease, it exerts no modifying effect upon it whatever. Two families now at the hospital illustrate the protective power to a high degree. In one containing eight persons, all were sick except the mother, who previously had had varioloid, and a child with a well-marked cicatrix from vaccination. This one child, vaccinated two years before, was the only one of the family exempt from smallpox,—none of the other children having been vaccinated. In another family, two vaccinated children lived among the smallpox cases without taking the disease, while all the rest of the family, not being vaccinated, were sick with it.

As regards the number of insertions, he had statistics upon this subject, which had appeared in the reports of the Board of Health. During the epidemic of 1871-72—when a large number of cases came under his observation—he found that one good cicatrix gave quite as much protection as half a dozen. He had seen persons with ten or twelve—even as many as seventeen—typical scars from vaccination in infancy suffer from smallpox, and he has known deaths to occur among such. Of course they had not been revaccinated.

In regard to Bryce's test mentioned by Dr. Woodbury, of vaccinating twice, with several days' interval,—the crusts dropping off at the same time,—he did not consider it of great value where the vaccination performed first was genuine.

COPAIVA IN SCIATICA.—

R Bals. copaiva, 3iv;
Tinct. lavandulae, 3iv;
Tinct. hyoscyami, 3iij;
Potass. bicarb., 3j;
Mucilag., 3j;
Aqua, 3vj.—M.

S.—A tablespoonful every four hours.

PATHOLOGICAL SOCIETY OF PHILADELPHIA.

THURSDAY EVENING, MAY 26, 1881.

The PRESIDENT, DR. S. W. GROSS, in the chair.

Primary cancer of the gall-bladder. By Dr. J. H. MUSSER.

MRS. McM., the patient from whom the specimens before you were removed, was under my care from the 9th of March until the 4th of May, 1881. Her illness dated from the middle of December, 1880, and continued until the 18th of May, 1881. She died in the Presbyterian Hospital, and I am indebted to Dr. Markoe for the privilege of this exhibition. The history previous to my attendance was apparently that of an intermittent fever with hepatic and gastric complications. The symptoms referable to the liver were paroxysmal lancinating pains in that region, at times so severe as to almost cause collapse. The gastric symptoms were epigastric pain, loss of appetite, flatulence, acid eructations, and, at variable intervals, attacks of vomiting. She had not been jaundiced.

I found her suffering from an intermitting fever with daily paroxysms, each beginning about 1 P.M. and continuing until 7 or 8 P.M. The chill lasted a half-hour, and was moderately severe; the fever lasted four hours, at its height the temperature being 103°. She was emaciated; her features indicated exhaustion and were somewhat pinched; her complexion was sallow; she was anaemic.

She suffered from severe paroxysmal pains in the epigastric and hypochondriac regions. The areas were tender on pressure, but no tumor was noticed. The liver-dulness extended three inches below the ribs in the nipple-line. The spleen was twice its natural size. The appetite was lost. She had nausea, acidity, and flatulence. The bowels were constipated. Urine contained neither albumen nor sugar. Urates and uric acid were in abundance.

During the course of her illness the symptoms may be detailed under three headings,—febrile, gastric, and hepatic. There seemed to be no relation between the different sets of symptoms, except the febrile and hepatic. The fever was more continuous when the jaundice was deepest. At the risk of some repetition, I will note them.

Gastric.—Tongue covered with a dark-yellow, heavy fur, moist, tremulous; later dry and brown. Bitter taste in the mouth, secretions viscid, loss of appetite, thirst, acidity, flatulence, weight and fulness after meals, epigastric pain and tenderness, nausea and vomiting. I desire to call particular attention to the nausea and vomiting. It, of all the gastric symptoms, was especially independent of any other symptoms. It occurred once in two weeks, once a week, or twice a week.

Each paroxysm lasted from two to four days. The fluid vomited varied, from a clear-white, sour, to a greenish-yellow, bitter liquid.

Hepatic.—Pain in the right hypochondriac region, paroxysmal, sharp, and lancinating, radiating to right and left shoulders and to epigastrium; tenderness on deep palpation, absence of tumor or irregularity of edges, enlargement as noted above. On account of liver-derangement, marked jaundice, with clay-colored stools and bile in the urine. The jaundice occurred four times while the patient was under my care. The first attack was light, lasting three days; the second and third each lasted a week; the fourth, beginning on the 25th of April, continued till death. With the second and third attacks the fever was remittent in character; with the last it was continuous. As the jaundice improved, the fever changed from the remittent to the intermittent type.

Febrile.—As may be inferred from the previous notes, the fever was irregular. At first it was intermitting, then remitting, and finally it became continued. At no time was the temperature higher than 104°. With the rise in temperature there was a corresponding pulse-rise. The increased pulse was not as great as a pulse at the height of a paroxysm of intermittent by twenty beats. The last month of illness it became rapid, feeble, compressible, and dicrotic. When the fever was remittent or continuous, in the evening there was delirium. The "typhoid" state developed the last ten days of her life, and death took place from cardiac failure. The use of anti-periodics prevented the paroxysms at first. As soon as the drug was suspended they recurred. Finally, in spite of any remedies, the fever continued.

The following facts also bear upon the case. The patient was a married woman, who had not lived with her husband for several years, on account of his brutality. She was 37 years old, a nurse by occupation. She had always been in poor health, and had had several attacks of biliary colic. The family history was good, save that a maternal aunt died of cancer. Her mother and brothers were living; her father had been killed.

The post-examination was made by Dr. Warnock. He reported that rigor mortis had set in early, that the body was greatly emaciated, and that all the tissues were stained with bile. With the exception of the liver and spleen, the organs were normal for a person who had died of heart-failure. The liver and spleen I examined carefully. The latter organ was about twice the normal size, of a dark greenish-brown color, of about normal consistence. Unfortunately, it was not examined microscopically.

The liver was of a peculiar shape. The right lobe was eight inches long, the left the same. Curiously, however, the lower edge of the latter lobe did not extend as low down as

that of the right lobe, but its upper edge was three and one-half inches beyond the same edge of the right lobe, while the lobe was doubled on itself to conform with the concavity of the diaphragm. Transversely the right lobe measured five and one-quarter inches, the left three and one-half. The former was two and one-half inches thick, the latter one and one-half. The gall-bladder was in the normal position and of the normal size. It was adherent to the duodenum. The color of the outer portion was pure white, not bile-stained. It was not collapsed, and was of firm consistence. A portion of the bladder underneath the liver, not quite as large as a walnut, was of natural color and fluctuated.

On section of the gall-bladder it was found that the white appearance of the exterior was due to cancer, which involved three-quarters of the organ. The growth encroached upon the cavity so that the walls were from one-half inch to one inch thick. The mass was of the appearance of a soft cancer; the inner surface had a ragged, ulcerated appearance, and in the centre of the mass was found a gall-stone the size of a filbert, with a rough surface, looking like a mulberry calculus. The stone was lying against the mouth of the gall-bladder; behind the stone was a cavity about the size of the stone, filled with a thick greenish-yellow fluid. From the appearances one would infer that the stone acted as a ball-valve to the duct. The duct was involved to and beyond the junction with the hepatic duct. The hepatic duct was enlarged, its walls thickened, its calibre much increased. The branches extending into the upper half of the right lobe were greatly dilated, even almost to the periphery of the liver, terminating in saccular dilatations. The ducts contained a thick grayish-green matter; the walls were of a slate-gray color, dotted with dark points. The liver-substance traversed by these ducts was dark and soft, not unlike gangrene. A part in the centre about three inches square was especially of this appearance. The remainder of the structure of the organ was slightly stained with bile and fatty in appearance.

On microscopic examination the malignant mass was found to be of the nature of a medullary cancer. The cystic and part of the hepatic duct was involved. The transition from the cancerous to the catarrhal process in the ducts was well marked. In the liver, catarrhal inflammation of the ducts was very distinct. In the lymphatic spaces around the ducts there was an abundant infiltration of epithelioid or indifferent cells. It was impossible to say, though it was highly probable, that the disease had involved the ducts. No doubt such would have been the case had the patient lived longer. The cancer of the gall-bladder was no doubt primary, from the ragged appearance of the mass and the absence of nodules. I shall try to determine

why the special ducts were involved, and will report the result to the Society. Dr. Formad very kindly confirmed the examination.

I desire to discuss elsewhere, in detail, the etiology, the clinical history, and the diagnosis. Remark, however, the relation of the gall-stone to the new growth as cause and effect in a person predisposed to cancer. Let me say, too, that I did not diagnose cancer of the gall-bladder. Long before her death I suspected internal malignant disease.

Dr. FORMAD said that he had examined the specimens microscopically, and had readily detected the presence of carcinoma of the soft type. The gall-ducts were strongly catarrhal, and the surrounding lymphatics were crowded with a small-celled infiltrate, which might possibly be metastatic, as some of the cells had a suggestive look. The presence of gall-stones in this case was of interest, as pointing to a local origin of the disease, since primary carcinoma of the gall-bladder is excessively rare.

Dr. MUSSER replied that Murchison teaches that primary cancer of this organ is always associated—probably causatively—with the presence of gall-stones.

THURSDAY EVENING, JUNE 22, 1881.

The VICE-PRESIDENT, DR. JAS. TYSON, in the chair.

Specimens removed in a case of preventive trephining for a compound comminuted depressed fracture of the cranial vault. Presented by Dr. C. B. NANCREDE.

Hugh McD., æt. circa 25 years, was admitted to the male surgical wards of the Protestant Episcopal Hospital in August, 1880. When I saw him his mind seemed clear, but his pulse was decidedly slow for a man who had been so severely injured and who had lost considerable blood. He had been struck down into the hold of a vessel by the falling upon him of about a ton of iron ore, which crushed his left leg to such an extent as to demand amputation. The fracture of the skull-vault must have been produced by his head striking against the corner of a bolt-head or nut, as it had evidently resulted from contact with some small, comparatively pointed object. The bone was much depressed over a small area, somewhat resembling a punctured fracture. Considering that, from its appearance, the inner table was probably extensively fractured, and believing as I do in "preventive trephining," I removed a circle of bone, elevated the depressed portions, and removed a number of fragments of the inner table, which had been driven down upon the brain and forced beneath the contiguous undepressed portion of bone. The wound was dressed antiseptically. As far as the head-trouble went, he did uninterruptedly well. If more compound comminuted depressed fractures of the skull were elevated before sec-

ondary mischief was lighted up, many more cases would recover than do under the present "let-alone" plan of treatment. I merely present this case as a typical one, for this is the second within a year in which I have performed preventive trephining successfully. After inflammatory trouble has been set up, trephining does not usually effect more than a temporary relief of the symptoms.

Dr. HENRY asked whether any symptoms of motor paralysis had been noted, as such cases would tend to prove the correctness of Ferrier's views. The site of this injury was such as should have produced motor paralysis of the upper extremity.

Dr. NANCREDE said that none had been detected.

Dr. SEILER related a case which he had seen when last in Vienna, where, by the knowledge gained by the experiments as to cerebral localization, the surgeon had correctly diagnosed the site of an old depressed fracture, which he had successfully removed by the trephine.

Dr. HENRY mentioned Dr. Detmold's successful case of trephining and opening of an abscess deeply seated in the brain-substance.

Dr. NANCREDE then made some remarks upon what had been done in the direction of a practical application to surgery of cerebral localization in France, and cursorily reviewed some of the recent literature of the subject.

Tumor of shoulder. Presented by Dr. J. M. BARTON, for Dr. L. H. ADLER.

The growth which I here present for Dr. L. H. Adler, of this city, was removed by him on the 24th instant from the shoulder of a married lady 28 years of age. It was covered only by skin and superficial fascia, but the deeper portions were embedded in the trapezius muscle. It had a distinct capsule, which was closely adherent to the muscle, and had to be removed by a tedious dissection. It had no bony attachments. The growth was noticed for the first time about two years ago, the patient stating that it was nearly as large then as now. It has never been the seat of pain, and the general health of the patient has been unaffected. The skin over the tumor was perfectly healthy. It was situated on the anterior edge of the trapezius muscle opposite the middle of the clavicle.

COCA WINE.—Under the name of *vinum Mariani*, says the *British Medical Journal*, Messrs. Roberts & Co. are introducing into England a preparation of coca prepared from the leaves of the *Erythroxylon coca*. It forms a very agreeable and, according to the clinical experiences of physicians in France as well as England, a very useful nervine stimulant. It is valuable as a remedial agent in cases of nervous exhaustion, over-study, or excessive mental exertion.

REVIEWS AND BOOK NOTICES.

SUPPLEMENT TO ZIEMSEN'S CYCLOPÆDIA OF THE PRACTICE OF MEDICINE. Edited by GEORGE L. PEABODY, M.D. New York, William Wood & Co., 1881. 8vo, pp. 844.

This work is intended to cover only the ground gone over in the original Cyclopædia, and it aims to make such additions as recent investigations and publications have rendered necessary.

The advantage of such a book as the present is that it gives the result of recent advances in medical science in a convenient shape for the busy but studious practitioner. The names of Dr. Peabody's collaborators are a sufficient guarantee that the work has been well done. Typhoid, Relapsing Fever, and Plague are dealt with by Dr. G. B. Shattuck, of Boston; Yellow Fever, by Dr. G. M. Sternberg, U.S.A.; Croup and Diphtheria, by Dr. F. P. Kinnicutt, of New York; Varicella, Measles, Ricketts, by Dr. F. Forcheimer, of Cincinnati; Smallpox, by Dr. F. P. Foster, of New York; Malarial Diseases, Dengue, by Dr. Henry M. Lyman, of Chicago; Cerebro-Spinal Meningitis, by Dr. J. Lewis Smith, of New York; Syphilis, by Dr. Jas. Nevins Hyde, of Chicago; Glanders and Anthrax, by Dr. James Law, of Ithaca; Hydrophobia, Trichinosis, Intestinal Parasites, by Dr. T. E. Satterthwaite, of New York; General Diagnosis and Therapeutics of the Diseases of the Larynx, by Dr. George M. Lefferts, of New York; Diseases of the Nose and of the Pharynx, by Dr. J. Solis Cohen, of Philadelphia; Diseases of the Pleura, by Dr. G. M. Garland, of Boston; Diseases of the Lungs, by Dr. Shattuck; Diseases of the Heart and Pericardium, by Dr. T. M. Rotch, of Boston; Diseases of the Arteries, Veins, and Lymphatics, by Dr. A. T. Cabot, of Boston; Diseases of the Stomach, Intestines, Spleen, by Dr. E. G. Cutler, of Boston; Diseases of the Bladder, Urethra, Prostate, etc., by Dr. R. F. Weir, of New York; Diseases of the Liver, by Dr. R. H. Fitz, of Boston; Diseases of the Female Sexual Organs, by Dr. Foster; Diseases of the Peripheral Cerebro-Spinal Nerves, by Dr. S. G. Webber, of Boston; Diseases of the Brain, etc., by Dr. L. Putzel, of New York; Diseases of the Spinal Cord, by Dr. R. Van Santvoord, of New York; Vaso-Motor and Trophic Neuroses, by Dr. J. J. Putnam, of Boston; Diseases of the Kidney, by Dr. A. B. Ball, of New York; Rheumatism, etc., Osteo-Malacia, Anæmia, Scrofulosis, etc., by Dr. C. E. Hackley, of New York; Diabetes, by Dr. H. N. Heineman, of New York; Hæmophilia, Purpura, Scurvy, by Dr. H. M. Bannister, of Chicago; Toxicology, by Dr. E. S. Wood, of Boston. We have given a list of authors and subjects at length because we think that in no way can we better convey an idea of the scope of this valuable work. When we add that the articles are for the most

part accompanied by a bibliography (that on syphilis being, very unfortunately, an exception), the reader can see that the book is one to be kept in mind for reference, and one which, if possible, should be placed upon the library shelves.

THE ORTHOPRAGMS OF THE SPINE. An Essay on the Curative Mechanisms applicable to Spinal Curvature, exemplified by a Typical Collection lately presented to the Parke's Museum of Hygiene, University College, London. By ROBERT HEATHER BIGG, Assoc. Inst. C. E. London, T. & A. Churchill, 1880. 8vo, pp. 150.

What is an orthopragm? That is the first question which will occur to the average reader on picking up Mr. Bigg's book, and for its solution we must refer him to the work in question itself. Mr. Bigg studies the human spine from the mechanical point of view, first in its normal conformation, then in its abnormal variations, and finally the broad principles upon which *restitutio ad integrum* is to be brought about by mechanical means.

ATLAS OF SKIN DISEASES. By LOUIS A. DUHRING, M.D., Professor of Skin Diseases in the Hospital of the University of Pennsylvania, etc. Part IX. (concluding the series). Philadelphia, J. B. Lippincott & Co., 1881.

We congratulate Professor Duhring on the accomplishment of his arduous labor in connection with this truly monumental production. Unaided and alone he has pushed through to completion, amid obstacles which those only can appreciate who have attempted a similar enterprise, a work which will last when systems and treatises are obsolete and forgotten; for the faithful delineations of disease, whether by pencil or by pen, can never become obsolete. We have frequently taken occasion, in our notices of the various parts of Professor Duhring's Atlas, to express our pleasure and admiration at the truthfulness and character of these representations of average skin diseases as found from day to day. Resisting the temptation to depict strange and monstrous diseases *ad captandum vulgus*, he has been content to represent skin diseases as the practitioner finds them; and in this lies the high value of his Atlas.

The present and concluding fasciculus comprises two plates of *eczema rubrum*, one of *pemphigus*, and one of *ecthyma*, of which we need say no more than that they are fully up to the standard of the previous plates,—the ecthyma, in fact, being, in our opinion, one of the most perfect in the series. A table of contents and a classified arrangement of the plates are placed at the end of the fasciculus, and the parts may be arranged for binding either as they have been issued or with the various affections grouped in due nosological order. Seven of the nine classes of skin diseases are represented in the completed

Atlas, the hyperæmias and the neuroses alone being unrepresented. Eczema, as the commonest of skin diseases, comes in for eight plates, representing it in all its various forms. Syphilis is represented by six plates, and the other affections by two or one each. Thus the whole ground is gone over, and the practitioner who has Duhring's Atlas is prepared for most of the affections with which he is likely to meet. The letter-press should not be ignored. It is not merely a description of the plates, but a condensed and carefully-written account of the disease, with the more trustworthy forms of treatment ordinarily employed.

A. V. H.

GLEANINGS FROM EXCHANGES.

ORTHOPNEA.—Dr. Henry Cook (*Practitioner*, June, 1881) defines the term orthopnoea to mean that exaggerated condition of dyspnoea in which the act of lying down becomes impossible, and the patient is constrained to assume the upright posture more or less absolutely, owing to the sensation of want of breath which supervenes on attempting to assume the prone position. A patient suffers from orthopnoea when,—1. he cannot fully inflate his lungs, either because of fluid or air in the pleural cavity, fluid in the air-cells and smaller tubes, consolidation of the lung, pneumonitis, or phthisis (though the condition in these is rarely met with), asthma, stenosis of the glottis from cedema or otherwise, emphysema, abnormal fulness of the abdomen (preventing the descent of the diaphragm), ascites, tympanites, and enlarged liver and spleen. 2. A patient suffers from orthopnoea when the circulation fails through inefficient action of the heart, from thinned or degenerated walls, from inefficient valves, from stenosis of its orifices or from fluid in the pericardium, from aneurism, or from tumors of the thoracic cavity.

In all these cases the essential condition giving rise to the orthopnoea is failure of or imperfection in the oxygenation of the blood, and consequently the circulation of impure blood through the nervous system. This, so long as the nervous system is still sensible of the injury done to it, incites the patient to make efforts to relieve the circulation of blood through the lungs. When the nervous system becomes oblivious to this circulation of impure blood, the patient gives up the struggle and assumes the recumbent position,—a sign of the worst import, and, indeed, of impending dissolution.

Dr. Cook gives several cases illustrative of the various forms of orthopnoea, and then goes on to inquire, "Why is the sitting posture essential to the successful performance of respiration in these cases?"

In cases of ascites the erect posture acts mechanically in relieving the diaphragm; the

same is true to a less degree in general dropsy, the interference being purely mechanical. But in diseases of the heart and aorta we must look deeper for the causation. Dr. Cook does not believe that the prone position can, under any circumstances, interfere with the action of the heart itself, nor does he think that the blood-flow in conditions resulting from imperfect valves could be influenced by this position. Whether, however, the nervous energy of the heart and arterial system can be affected by position is open to critical consideration. The conditions affecting this are very complicated and intricate, and include the nervous supply to the heart, both cerebral and sympathetic, and the vaso-motor supply to the arteries.

Dr. Cook thinks that as the great sympathetic ganglia which supply the motor force to the heart are intimately connected with and acted upon by the other divisions of the double nervous system, it is not improbable that to this central cause may be due the partial paresis of the muscular tone of the arterial system which, he goes on to show, results on assuming the prone posture, and as a result, in part at least, of this, the embarrassed condition of the circulation, and consequently of the respiration, which produces the state of orthopnoea. Experiments with the sphygmograph, tracings from which are included in Dr. Cook's paper, confirm this view.

The treatment recommended by Dr. Cook in cases of mechanical difficulty is that of free purgation by hydragogue cathartics. As regards the physiological difficulty,—this having been shown to be dependent upon diminished tone of the arterial system,—our remedies should be such as are calculated to influence this condition. If we can by the action of drugs restore to a certain extent the lost tone, we may expect to relieve the difficulty of the circulatory system, and, through it, of the respiratory.

Now, digitalis does this. It strengthens the action of the heart, slowing and steadyng it, and rendering the contraction of the ventricles more efficient; but, beyond and probably independent of this, it raises the tone of the arteries, increasing the contractile power of the muscular coats and bringing it back to the condition more nearly approaching that of health.

Strychnia may be looked upon as a valuable ally and supporter of the action of digitalis. In Dr. Cook's cases, the hourly administration of *nux vomica* and digitalis had the best effect.

A NEW METHOD OF TREATING RECTAL FISTULE.—Dr. H. A. Reeves, in a note to the *British Medical Journal* (vol. i., 1881, p. 917), says that he operated on a fistula about two and a half inches long, dividing it in the usual way and then scraping away all pseudomembranous tissue and granulations with a sharp scoop. Both surfaces of the wound having

been vivified, and hemorrhage having ceased, three deep silver sutures were passed, entering the skin about a quarter of an inch from the edge of the wound, and, passing well beneath the floor of the fistula, were brought out at the same distance on the other side of the wound. The upper stitch ran through the coats of the rectum into the surrounding tissue. These stitches were removed a week after the operation (but might have been removed sooner), when the wound was soundly healed. The patient has been perfectly well since. Dr. Reeves thinks this plan will do away with the painful dressings which have to be resorted to in the common mode of dressing these wounds, and will expedite the cure of rectal fistulæ. All loose folds of skin about the fistulous track must be removed.

THE EFFECTS OF DRUGS DURING LACTATION ON THE NURSING.—The result of Mr. T. M. Dolan's experimental inquiry into human milk and the effects of drugs during lactation on either nurse or nursing, as published in the *Practitioner*, may thus be summarized. All therapeutic agents intended to act on the mammary gland must first enter the blood, or be capable of stimulating the blood-supply in the mammary apparatus. This principle follows from what we know of the processes involved in the making of milk, and depends on the general principle that nutrition is dependent on the blood-supply. Further, all drugs derived from the families Dilleniaceæ, Cruciferæ, Solanaceæ, Umbelliferae, etc., enter the blood and impregnate the milk, so that poisons in any of these classes must be administered with caution to the mother or nurse, lest the nursing be injured. Mr. Dolan has furnished instances where dill, aniseed, and conium had this effect. Again, there is no galactagogue in the sense in which it is understood. The nearest approach to such an agent is to be found in jaborandi; but this drug is not persistent in its action, as it only temporarily affects the mammary secretions. There is, however, an anti-galactagogue,—belladonna. The milk also of the mother may be improved in heat-forming elements by the administration of fat, and the salts of milk may be improved by the administration of medicines. Then various physiological actions—purgative, alterative, diuretic, etc.—may be produced in the child by the administration of drugs to the mother, as is well known. Finally, if we are to expect any improvement in milk-secreting power, as to both quantity and quality, we must look to diet for the attainment of that object.

Three nitrogenized compounds, vegetable fibrin, albumen, and casein, supply flesh-forming food. The chemical analysis of these three substances has led to the very interesting result that they contain the same organic matter, united in the same proportion by weight, and, what is still more remarkable, that they are identical in composition with

the chief constituents of blood, animal fibrin and albumen. They all three dissolve in concentrated muriatic acid with the same deep purple color, and even in the physical elements animal fibrin and albumen are in no respect different from vegetable fibrin and albumen. In regard to the presence and relative amount of sulphur, phosphorus, and phosphate of lime, no difference can be observed.—*New York Medical Record*.

HYDROCHLORIC ACID POISONING—RECOVERY.—Dr. MacDonald (*Edinburgh Medical Journal*, June, 1881, p. 1093) was called to see a man who had taken an ounce and a half of hydrochloric acid, presumably in one gulp, as there was no corrosion of the mucous membrane of the mouth or fauces. He had taken, by way of antidote, before the doctor's arrival, a teaspoonful and a half of bicarbonate of sodium, and a bottle of soda-water. Dr. MacDonald immediately gave him a cupful of solution of carbonate of sodium, which was rejected with some coffee-ground-like matter. The patient was then surrounded with hot-water bottles, and was directed to have milk alone as a nourishment. Subsequently the temperature rose to 102°; pulse, 100 to 108. The epithelium of the tongue became leathery and ichthyosed in appearance; and this cleared off on the tenth day. There was complaint of pain opposite the cardiac and pyloric stomachic orifices, and general tenderness over the abdomen. Opium was given for sleeplessness, and turpentine stupes were placed over the whole abdomen. A little diarrhoea of irritation set in, the stools smelling of turpentine. The inflammatory danger over, convalescence was uninterrupted save by a little cough, which succumbed to an ordinary mixture. Dr. MacDonald remarks on this case that it gives evidence of the low corrosive power of hydrochloric acid; the absence of mouth-signs to aid the diagnosis, which might happen in a case where no information could be had as to the poison taken; the diarrhoea of irritation containing absorbed turpentine; and the apparent general result to the patient of only some gastric catarrh, evidence of cesophageal stricture or gastric ulcer being in the mean time wanting.

CARBOLIC ACID IN WHOOPING-COUGH.—Dr. MacDonald (*Edinburgh Medical Journal*, 1881, p. 1094) says that on extended trial he finds carbolic acid, in doses of one-fourth minim to a child of six months, one-half minim for a year, and one minim for two years and upwards, to be the best remedy for whooping-cough. The whoop goes; the vomiting ceases; the paroxysms are modified in intensity and frequency. This result Dr. MacDonald believes to arise from a similar action to that of creasote on the motor fibres of the vagus to the stomach, and from a lowering of vitality of the specific germ of whooping-cough disease. This points to the

antiseptic treatment of the zymotic diseases generally.

BELLADONNA-POISONING TREATED SUCCESSFULLY BY PHYSOSTIGMA.—Dr. Hudson, of New Zealand (*British Medical Journal*, vol. i., 1881, p. 918), in the case of a man who had injected a considerable amount (probably the twelfth of a grain) of atropia hypodermically, gave hypodermic injections of a solution of the extract of physostigma (quantity not mentioned). The patient recovered.

ATROPIA FOR THE PAIN OF CANCER.—Auger (*Edinburgh Medical Journal*; from *Union Medicale*) uses a lotion of 1 part in 1000 of sulphate of atropia, applied by means of a compress wetted with the solution and covered with oil-silk. This gives considerable relief to the pain of cancer without causing dilatation of the pupil or dryness of the throat.

MISCELLANY.

REQUEST FOR SPECIMENS OF SUSPECTED WATER.—Dr. J. W. Mallet, of the University of Virginia, has undertaken, by order of the National Board of Health, a careful study of the chief methods in use for the chemical examination of potable water, so far as organic matter is concerned. It is particularly requested of the correspondents of the Board, of medical men throughout the country, and of others interested in sanitary matters, that any well-marked case of disease which may seem on medical grounds fairly attributable to organic impurities in drinking-water be promptly reported to Dr. J. W. Mallet, University of Virginia Post-Office, Albemarle County, Virginia, with a few lines stating clearly the medical nature of the case and the character of the evidence on which the water in question is suspected of having actually caused disease in persons who have used it. It is further desired that a sample of each such water be forwarded for examination, *but not until notice has been received from Dr. Mallet that the analysts are ready to proceed with it*, since it is important that no useless delay should occur between the shipping of the sample and its investigation in the laboratory. In notifying any one who may be able to furnish specimens of suspected waters that may be forwarded, clear instructions will be sent as to the quantity of water required, and the mode of collecting, packing, and shipping it. It is particularly desired that no case be presented on doubtful or vague evidence, since one important object of the inquiry demands that all such be rejected, and only those cases examined which involve the strongest grounds for believing that mischief has really been caused by organically foul drinking-water.

The cost of packages and transportation for samples will be borne by the Board of Health.—*National Board of Health Bulletin.*

SANITARY EXHIBITION IN NEW JERSEY.—The New Jersey State Fair, to be opened at Newark on September 19, is to have a sanitary annex, as it has had for the two previous years. It is intended to make an attractive exhibition, so that visitors to the Fair may become acquainted with the best sanitary arrangements and inventors and dealers have a good opportunity for comparing and testing apparatus. An abbreviated summary of articles to be exhibited is given in the *National Board of Health Bulletin* for July 9. It comprises construction materials, furniture, wallpaper, etc., heating and ventilating apparatus, drainage and water-supply, bathing apparatus and bath-room fixtures, with gas and other lighting apparatus, druggists' samples and preserved foods, excavating and odorless apparatus, life- and labor-saving apparatus, gymnasium apparatus, sick-chairs and beds and sick-room appliances, food-adulteration and testing apparatus. Letters of inquiry may be addressed to E. A. Osborn, C.E., Middletown, N.J., or to State Board of Health, Trenton, N.J.

ENTERPRISING SURGERY.—The rage for "bold" and "daring" operations seems to have taken complete possession of the German surgeons. Dr. Zeller, of Berlin, proposes to open the trachea as a prophylactic measure during operations, and Dr. Gluck has carried out successfully the complete removal of the bladder and prostate in dogs, and hopes before long to do the same in the human subject.

DEATH OF PROF. PERLS.—The University of Giessen has sustained a severe loss by the death, on May 15, of Dr. Max Perls, Professor of Pathological Anatomy and Director of the Pathological Institute. His fame chiefly rests upon his "Allgemeine Pathologie," completed in 1879.

OFFICIAL LIST

OF CHANGES OF STATIONS AND DUTIES OF OFFICERS OF THE MEDICAL DEPARTMENT OF U. S. ARMY FROM JULY 24 TO AUGUST 6, 1881.

HUBBARD, VAN BUREN, CAPTAIN AND ASSISTANT-SURGEON.—Granted leave of absence for four months. S. O. 169, A. G. O., July 26, 1881.

KING, WM. H., CAPTAIN AND ASSISTANT-SURGEON.—Now awaiting orders at Greencastle, Pa., to report in person to Commanding General, Department of the East, for assignment to temporary duty. S. O. 171, A. G. O., July 28, 1881.

TORNEY, GEO. H., CAPTAIN AND ASSISTANT-SURGEON.—The leave of absence granted him from headquarters, Department of the Missouri, June 21, 1881, extended one month. S. O. 76, Military Division of the Missouri, July 25, 1881.

GARDNER, EDWIN F., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—Relieved from duty in Department of Dakota, to proceed to Eastport, Me., and on arrival there report by letter to the Surgeon-General. S. O. 171, c. s., A. G. O.

GARDNER, EDWIN F., FIRST-LIEUTENANT AND ASSISTANT-SURGEON.—The operation of paragraph 3, S. O. 171, c. s., A. G. O., in his case, suspended one month. S. O. 177, A. G. O., August 4, 1881.